Farmers' Irrigation District
Nebraska

REHABILITATION AND AGRICULTURAL REPORT

by

DIVISION OF IRRIGATION
BUREAU OF AGRICULTURAL ENGINEERING
UNITED STATES DEPARTMENT OF AGRICULTURE

PAUL A. EWING
Associate Irrigation Economist

WELLS A. HUTCHINS
Irrigation Economist

WITH CLASSIFICATION OF LANDS

by

UNIVERSITY OF NEBRASKA
Conservation and Survey Division and Agricultural Experiment Station

May, 1933

F A R M E R S' I R R I G A T I O N D I S T R I C T

N E B R A S K A

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INTRODUCTION

This report discusses the agricultural and financial conditions in Farmers' Irrigation District, Nebraska. In common with other agricultural communities, this District suffered severely from the sharp drop in prices of agricultural products which began in 1930. All payments on bond obligations due in 1931 were met in full, but in 1932 part of the bond interest and most of the original bonds maturing in that year were not paid.

The board of directors of the District and the members of the Bondholders' Protective Committee jointly requested the United States Department of Agriculture, through the Bureau of Agricultural Engineering, to make a survey of the District and report upon the factors affecting its ability to meet its obligations. The request was acceded to, but on account of limited appropriations it was stipulated that the District and the Bondholders' Committee should pay the field expenses of the Federal employees assigned to the work, the Department of Agriculture carrying their salaries. The authors of this report were accordingly designated to carry out the assignment under the direction of W. W. McLaughlin, Chief of the Division of Irrigation. The field work was done in March, 1933, and the report prepared immediately afterward.

The District and the Bondholders' Committee likewise requested the University of Nebraska to make a classification of agricultural lands within the District, under the same financial arrangement as that with the Department of Agriculture. The classification was made by Dr. G. E. Condra, Dean of the Conservation and Survey Division, J. G. Russel, of the Nebraska Agricultural Experiment Station, C. L. Dow, of the Department of Geography, and F. A. Hayes, of the Bureau of Chemistry and Soils, United States Department of Agriculture.

The cooperation accorded the authors in procuring and assembling information and otherwise assisting in the investigation was most gratifying, and materially shortened the time that otherwise would have been required. Acknowledgments are due particularly to personnel of the Farmers' District, the United States Bureau of Reclamation, and the Great Western Sugar Company, as well as to numerous farmers, to business and professional men of Scottsbluff and Gering, and to county officials and others having dealings with the District. Mr. Leslie Bowen, Assistant Irrigation Engineer of the Bureau of Agricultural Engineering, devoted time to the climatic and engineering features and prepared portions of the report dealing with those subjects.

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Location

The District diverts its water from, and its area parallels, North Platte River in the extreme western portion of Nebraska, its headworks being located about one mile east of the Wyoming-Nebraska State line. Irrigation service begins a short distance from this place to the group of preferred water-right holders. For several miles the District's area is a relatively narrow strip, which broadens somewhat abruptly about three miles east of Mitchell. The broadening tendency increases gradually, so that at its extreme eastern end, about 45 miles from its headworks, the District has a width of approximately six miles. Save for the short distance between the headworks and the State line, the main canal traverses the entire length of Scotts Bluff County, and slightly more than two-fifths of the area is in Morrill County.

The main canal is the upper or northern boundary of the District, while a succession of mains of neighboring enterprises -- Ramshorn, Enterprise, Winters Creek, Minatare, Bayard, and Alliance Canals -- marks, with some necessary connections, the lower boundary. The latter, at the eastern end of the District, is some 2½ miles north of the river.

As the District is bounded on the north by the Pathfinder Irrigation District, originally a unit of the North Platte project of the United States Bureau of Reclamation, it occupies an intermediate section of the agricultural area north of the river, having neighboring irrigation developments on both sides of its own area. In addition, near the eastern terminus of and in its main canal, is the headgate through which water deliveries are made to the Northport Irrigation District, another original Government unit, which is thus its eastern neighbor; and across the river are other reclamation developments, notably the Gering and Fort Laramie Irrigation District -- a third unit of the original Government project -- and several smaller irrigation projects built with private capital.

Area

The District contains an assessed area of 62,473.6 acres, of which 35,628.4 acres lie in Scotts Bluff County and 26,845.2 acres in Morrill County.

The estimated area in town lots, railroad right of ways, and small tracts is around 1,900 acres, included in the above total.

The area of assessed lands served with water in 1932 was 47,151 acres. In addition, an area of about 3,000 acres of preferred water-right lands was irrigated.

Climate

The climate of the District is typical of the High Plains country (altitude of Scottsbluff: 3,880 feet). It is subject to wide extremes of temperature and the low rainfall is variable and comes in local showers of short duration.

The precipitation record for Scottsbluff, depicted on the chart below (Fig. 1), covers the years from 1889 to the present.[1] This shows a mean annual precipitation of 16.11 inches, of which 12.20 inches falls in the crop season (April 1 to September 30).

The yearly average is 180 to 190 clear days, 60 to 70 cloudy days, and the rest partly cloudy. Winter temperature means are around 27° F, and extremes are as low as -45° F. Summer means are just below 70° F, and extremes as high as 105° F or 106° F. The extreme variability and amount of rainfall make the results of the most carefully practised methods of dry farming highly uncertain. The region is seldom without wind, and evaporation from the soil is so rapid that a light shower has little effect upon vegetation. The average snowfall is about 30 inches, two-thirds of which occurs between December and March.

The daily range of temperature during the warm months is wide. Because of the low humidity the atmosphere heats rapidly in the daytime and cools rapidly after sunset. Even in the hottest weather the nights, with few exceptions, are cool. This has a retarding effect on the growth of some crops that otherwise would be well adapted to the locality; on the other hand, it is favorable to sugar beets, as are also the summer mean temperature of slightly less than 70° F and the average growing season of about 130 days, the last killing frost usually coming a few days before May 15, and the first killing frost usually around September 21 or 22.

The prevailing wind direction for the year is from the northwest, but during the months of June, July, and August the wind blows from the south most of the time, and more or less frequently during the other months. Its average velocity is 10 to 11 miles per hour, but this increases to 30 to 50 miles during storms. Tornadoes are rare, but heavy and destructive hail storms, although they usually afflict small areas, occur not infrequently during the growing season.

Transportation and Markets

Two railroads are accessible for the transportation to distant market of such of the produce of the District as is not consumed locally, being supplemented by good highways. All the towns to which the District is tributary are stations on the branch of the Chicago Burlington & Quincy Railroad which connects its Black Hills and Billings-Denver lines, providing

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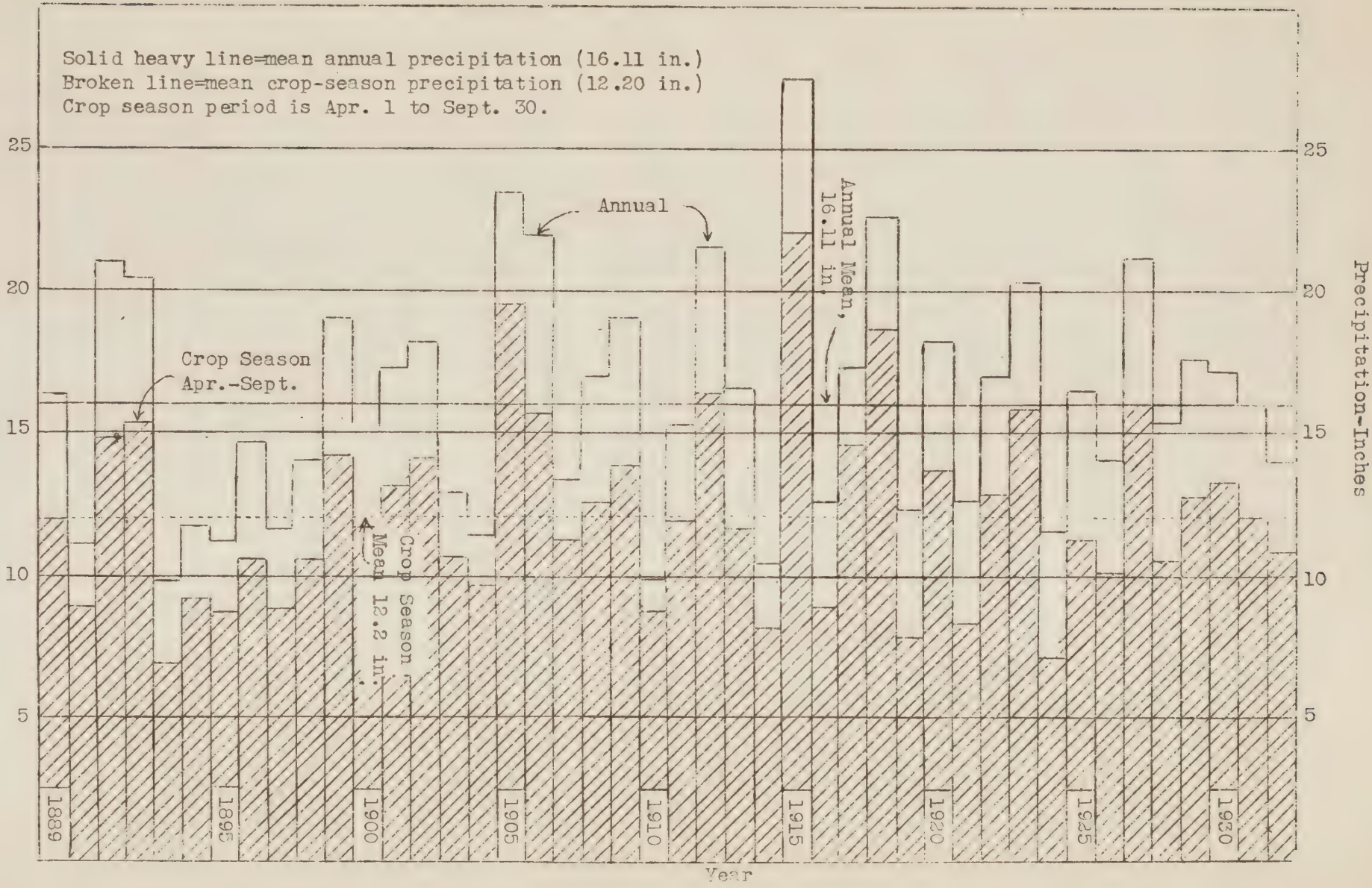
1/ The record from 1889 to 1906, inclusive, is for Gering, 3 miles south of Scottsbluff.

Figure 1. - Precipitation at Scottsbluff, Nebraska, 1889-1932.
(Record for 1889-1906, incl., is for Gering, 3 miles south of Scottsbluff)



an outlet to both eastern and western markets. Likewise, a branch of the Union Pacific, while serving more conveniently the areas south of the river from Northport westward, makes direct connections with the system's main line at North Platte, Nebraska and Cheyenne, Wyoming. Numerous railroad spurs lead to sugar beet dumps within or near the District lands.

The main highway paralleling the river on the north side passes through Bayard, Minatare, Scottsbluff, Mitchell, and Morrill, and is paved for that distance. Numerous tributary county roads, many of them well graded and gravelled, traverse the District.

Aside from the products of the sugar factories, the heaviest freight shipments from the District are live stock, principally beef cattle and lambs, which are sent to Denver, Omaha, Sioux City, and Chicago. On these the freight rate from range to river markets is 52 to 75 cents per hundredweight, with an extra charge of 8½ cents from feed yard to market if the stock is fed in transit, the usual arrangement being to bring the stock from the range in the autumn, feed it during the winter, and continue it on its journey to market in the spring. The rate on cattle and sheep from local stations only to Omaha is 40 cents per hundredweight. Compilations made by S. K. Warrick, secretary of the Colorado-Nebraska and North Platte Valley Lamb Feeders' Association indicate that the actual cost of shipping fat lambs to four of the principal markets, including the 8½ cent feed in transit rate, averages from 36.01 cents to 64.4 cents per head. Car lot rates apply to a minimum of 20,000 pounds.

Some considerable use is made of trucks in getting certain produce to the nearer markets, and a few farmers who were interviewed told of taking potatoes by this means to markets farther away even than the Missouri River.

A cooperative factory at Gering handles much of the produce of the dairy cows in the District. Following is the record of its butter and cheese manufacturing for the past three years. This factory represents a consolidation, effected in 1931, of five prior units. Its patrons and members number about 1,000.

Year	Cheese	Butter
1930	1,109,012 pounds	
1931	954,218 "	195,584 pounds
1932	248,986 "	439,617 "

A factory at Scottsbluff is of about equal capacity, while a somewhat smaller butter factory is at Mitchell.

The passenger service of the railroads is competed with by stages.

Population and Industrial and Social Conditions

The population of the District is estimated at 3,000 persons, or about 700 families, A small part of the city of Bayard (45.6 acres) is within the District, as is also a larger section of Morrill (186.6 acres). The population of the various cities to which the District is tributary was reported as follows in the Federal census of 1930: Morrill, 756; Mitchell, 2,055; Scottsbluff, 8,474; Minatare, 1,080; Bayard, 1,559. Gering, the county seat of Scotts Bluff County, had a population of 2,528, and Bridgeport, county seat of Morrill County, 1,421.

The District is well served with schools, several of the school houses being of recent construction and of impressive modernity.

The principal outstanding industrial activity of the entire community, aside from farming itself and the transportation of farm products, is represented by the six factories of the Great Western Sugar Company, at Scottsbluff, Gering, Bayard, Minatare, Mitchell, and Lyman. These provide labor for several thousand people during the winter months, and represent a payroll which makes an important contribution to the business of the towns. D. J. Roach, of the Sugar Company, estimates that, in the two counties, from 10,000 to 15,000 people are engaged as farmers or beet and farm laborers who would not be employed under other types of agriculture than that involving the raising of beets, and that an additional 5,000 are engaged in factory work and miscellaneous business enterprises because of the beet industry.

Much of the factory labor, however, as well as much of the labor employed in the beet fields, is of an itinerant nature, and is made up largely of Russians and Mexicans.

ORGANIZATION AND FINANCING

Farmers' Irrigation District was declared organized by the Board of County Commissioners of Scotts Bluff County, Nebraska, April 19, 1897, following an organization election at which the vote was 29 "yes" and 1 "no." It was not until 1913 that bonds were issued for the purpose of acquiring an irrigation system.

The Farmers Canal was begun in 1887 by a group of landowners who did much or all of the first canal work and whose respective interests were represented by shares of stock in the Farmers Canal Company, each share representing 40 inches of water for 40 acres of land. The canal was thus built for a distance of about 10 miles. This was essentially a cooperative undertaking. In 1891, however, control passed to others who proposed to extend the system to cover a large area of land and who actually accomplished a large amount of construction work before the financial stringency of 1893 made it impossible to continue. As a part of the reorganization of 1891 the original landowner-stockholders surrendered their shares of stock, and in return were given water-right con-

tracts purporting to grant perpetual rights to the use and delivery of water without charge. These were the "preferred rights" which will be referred to later in this report. These landowners thereafter had no proprietary interest in the canal system, although during the period of financial embarrassment of the reorganized Canal Company they operated and maintained the original 10-mile section of the main canal with the Company's permission in order to get water to their own headgates.

The Tri-State Land Company acquired the properties in 1904, after foreclosure of a trust deed, and transferred title to the irrigation system to its subsidiary, the Farmers Mutual Canal Company. The plan was to sell land together with shares of stock in the irrigation company entitling the purchaser to receive water for his land; the purchasers eventually to own and operate the irrigation system as a private, mutual enterprise. The Tri-State Land Company carried out its construction program with the proceeds of paid-up capital stock and a bond issue and sold considerable land with Farmers Mutual shares attached, but eventually abandoned the mutual irrigation company plan and in January, 1913 caused the irrigation system to be transferred to Farmers' Irrigation District. Consideration for the sale was $2,550,000 of District bonds plus $153,000 additional to cover the first year's interest on the $2,550,000 issue, thus making a total of $2,703,000 of District bonds bearing 6 per cent interest.

Prior to the sale to the District, the Tri-State Land Company had executed a Warren Act contract under which it agreed to pay $500,000 to the United States over a period of years in consideration of the delivery of water from Pathfinder Reservoir according to a definite schedule. In 1915 the District undertook to pay the balance due on this contract, amounting to $475,000, and in consideration received for cancellation from the Tri-State Land Company $500,000 of District bonds, this being the amount which is stated to have been included in the purchase price as compensation for the Warren Act contract rights. This transaction reduced the bond issue to $2,203,000. So far as the District was concerned, it involved refunding $500,000 of bonds bearing 6 per cent interest into a $475,000 contract obligation without interest, thus making a net $25,000 reduction in principal.

A further reduction of bond principal was made pursuant to an offer by the Tri-State Land Company Bondholders' Committee, which controlled the District bonds. The Committee offered to cancel $203,000 of District bonds, reduce the interest rate from 6 to 4 per cent, and make the principal and interest of the balance payable according to the terms of the Reclamation Extension Act of 1914, provided the District system should be taken over by the United States. The offer was dated June 22, 1915. The necessary contract with the United States was obtained in 1917, but the refinancing was not accomplished until after extensive negotiations and litigation. Refunding bonds dated January 1, 1921, and issued pursuant to a stipulated court decree entered in April of that year, were exchanged for all excepting $97,700 of the original issue, and the system was taken over by the United States for a time as stated

hereinafter. The principal of these refunding bonds is stated to have been $1,902,000, amortized at 4 per cent interest.

Still another reduction of principal was made by agreement in 1926, and at the same time other outstanding indebtedness of Farmers' District was refunded into new bonds. The value of the 1921 refunding bonds and accrued interest as of January 1, 1926, as stated in the resolution authorizing their refunding, was $1,681,038.99; this being computed by discounting all the unpaid installments of principal and interest payable thereafter at 6 per cent per annum. At that time the District owed $196,427.42 as the unpaid portion of a judgment secured in behalf of the Bondholders' Committee of Tri-State Land Company in 1922. The Bondholders' Committee agreed to cancel all outstanding District bonds under its control, together with the unpaid balance of the judgment, in consideration of a new issue of $1,500,000 of 6 per cent District bonds; and at the same time the Omaha Trust Company accepted $500,000 of new 6 per cent bonds in exchange for $500,000 principal amount of outstanding notes and warrants. The total bond issue of $2,000,000, dated January 1, 1926, is now outstanding, together with $18,900 of the original 1913 bonds not refunded and not yet redeemed and $15,500 of Red Willow drainage bonds.

The schedule of payments to the United States under the contract of 1915 was revised in 1927, after a long period of negotiations and threatened litigation. The amount still outstanding December 31, 1932, according to the District audit, was $306,714.66. The status of the payment made in 1931 is discussed later.

It thus appears that while the District has made substantial payments of principal and interest on its indebtedness, it has likewise received from the bondholders large concessions in the writing off of both principal and unpaid interest. The principal of outstanding bonds is now slightly more than it was immediately following the refunding of 1921.

Farmers Canal and Farmers' Irrigation District have been involved in a great deal of litigation in both Federal and State courts. The District's predecessors in interest were litigants in proceedings concerning the appropriation of water and the status of preferred rights; while the District itself has been in many cases dealing with such matters as payment of bond interest, legality of contracts, maintenance of bridges, eminent domain proceedings, drainage of seeped lands, damage from flood waters, refund of assessments paid under protest, assessments against subirrigated lands, proceedings under the workmens' compensation law, and closing orders issued by the State. There are now pending three additional cases in which the District is a party and a fourth case in which it may become a party.

The District has excellent water rights. It has a natural-flow right of early priority from North Platte River covering an area larger than the present area of the District, and a contract with the United States involving storage in the Pathfinder Reservoir, constructed in connection with the North Platte Reclamation Project.

The natural flow of the North Platte during the latter part of the irrigation season has frequently been less than needed to satisfy the District's earlier priority. Consequently the Pathfinder contract has proven a most valuable asset. Negotiations for a revision of the contract are now pending, inasmuch as the District desires more late-season water than provided by the schedule of delivery. That is to say, the schedule in the contract provides a maximum delivery considerably less than authorized by the natural-flow right. What the District is seeking is sufficient storage to maintain the summer delivery of water at the full amount of its earlier natural-flow right.

Natural Flow Rights

Farmers' Irrigation District is the holder of two priorities on North Platte River recognized and recorded in the Bureau of Irrigation, Water Power and Drainage, Nebraska Department of Public Works:

(1) Docket No. 918. The date of priority is September 16, 1887, and the amount allowed not to exceed 1142-6/7 second-feet for about 80,000 acres of land, limited to one-seventieth second-foot per acre, through the Farmers Canal. The order of the State Board of Irrigation in this docket was dated January 9, 1897.

An additional 3.07 second-feet, with the same date of priority, through the Ramshorn Canal, is credited to the District in Docket No. 918 "R".

(2) Application No. 660. This application was filed by William Frank for the Columbia Canal April 14, 1902. It was allowed by order of the State Board of Irrigation dated January 25, 1905, in an amount not to exceed 600 second-feet, with priority as of April 14, 1902.

Between these priorities of 1887 and 1892 there are intervening Nebraska rights to 2,653.02 second-feet on the North Platte and 2,052.76 on the Platte.

The 1887 priority has been the subject of much controversy and litigation. The right was initiated by the posting of notices of appropriation by the settlers who built the original 10 miles of canal. Little or no construction work was done between 1893, when Farmers Canal Company ceased activities, and 1904 or 1905, when the Tri-State Land Company took over the system. Nevertheless the decision of the State Board of Irrigation in allowing an appropriation of 1142-6/7 second-feet was

twice upheld by the Supreme Court of Nebraska (Appendix A, Nos. 1 and 7), one of the cases going to the United States Supreme Court on writ of error. (Appendix A, No. 8) which was dismissed for want of jurisdiction.

Allowable normal flow diversion. - The Nebraska statutes provide that no allotment shall exceed one second-foot for each 70 acres, or three acre-feet per acre per year, aside from storage waters. The allowable diversion of normal flow depends upon the area irrigated, which is determined from acreage reports filed with the State. As the 1932 acreage report for Farmers' Irrigation District covered 66,490 acres, the actual natural-flow diversion was limited to 950 second-feet.

Negotiations are under way at present for the correction of certain errors found in the description of lands for which water is appropriated. It is therefore probable that some change will be made in the acreage report for 1933.

Position of 1887 priority on the river. - This priority is subsequent in point of time to an appropriation of 300 second-feet through the North Platte Canal near Hershey, Nebraska, dated May 31, 1884, and to an an appropriation of 22 second-feet for irrigation and 140 for power through the Kearney Canal on Platte River near Grand Island, dated September 10,1882.

The strategic location of the Farmers' diversion with reference to these earlier Nebraska priorities is favorable, for the increase in flow of North Platte River between the State line and the City of North Platte is very great indeed.[1/] The State authorities take the position that return water from irrigation, which constitutes a large part of this increase, is a part of the natural river flow. The United States Bureau of Reclamation, on the other hand, claims title to all water arising on Federal projects. In the absence of a specific court determination, the Nebraska authorities distribute the increase as natural flow, regardless of origin.

The 1887 priority also antedates most of the Wyoming rights. A tabulation of priorities on the North Platte between Pathfinder Reservoir in Wyoming and the Wyoming-Nebraska State line, made in the office of the State Engineer of Wyoming April 1, 1931, shows four ditches totaling 121.20 second-feet with priorities earlier than September 16, 1887, all adjudicated. One of these ditches carrying 22.01 second-feet is indicated in the list as "abandoned." The Federal North Platte Project appropriations and a large number of private appropriations are later than 1887.

1/ The Nineteenth Biennial Report, Bureau of Irrigation, Water Power and Drainage, Nebraska, p. 303, shows the increase in July, August, and September, 1931, to have been 241,690 acre-feet. This represents an aggregate average flow of approximately 1300 second-feet.

Pathfinder Storage Rights

The Warren Act contract between the Tri-State Land Company and the United States to which the Farmers' District succeeded, as indicated under "Organization and Financing," provides that the United States "will impound and store water in the Pathfinder Reservoir or elsewhere and release the same into the North Platte River, and will supply water from other sources for the Company's canal at convenient points above irrigable lands under the Company's canal" for the use of the Company, with the right to deliver drainage or seepage waters as a part of the total delivery. The District has no storage rights or facilities other than those provided by this contract.

The contract as originally drawn and as now in force sets out a schedule of delivery beginning with 100 second-feet on April 15 and increasing uniformly to 277 second-feet on April 30, to 528 on May 31, and to 713 on June 30; remaining at 713 throughout July; then diminishing uniformly to 500 second-feet on August 31, to 300 on September 30, and to 100 on October 15, the close of the irrigation season; the total amount involved being approximately 180,000 acre-feet. The delivery of such water to be accepted by the Tri-State Land Company "as in full satisfaction of all its rights to the water of the North Platte River, both natural flow and surplus storage" from the Reclamation Service reservoirs.

The District has been operating under this contract since it took over the system in 1913. So long as water is plentiful in the river there is no restriction on deliveries; for many years the supply was sufficient to allow late-season deliveries to the District in excess of those provided in the contract. Demands from new areas brought under irrigation, however, coupled with successive water shortages, have considerably reduced the available supplies during the past few years and have led to controversies between the District and the State over closing orders in late summer and to negotiations for adjustment of the Pathfinder schedule. The sugar-beet water requirement is an important factor in this situation, inasmuch as irrigation of sugar beets is confined almost entirely to the second half of the irrigation season. Likewise in view of the heavy losses from a canal of such length (estimated at 32 per cent of the diversion in 1932), it is maintained that a maximum headgate diversion of 713 second-feet is not adequate.

Substitution of Drainage Waters

Part of the cross-drainage water is diverted into the Farmers Canal during the irrigation season and mingled with water diverted directly from North Platte River. The United States built the diversion on Sheep Creek Drain and maintains it, and likewise built a small diversion on Tub Springs Drain which has since been enlarged by the District and is maintained by the District. Diversions on Dry Spottedtail and Alliance Drains were built by the District. Akers Draw and Wet Spottedtail Drains open directly into the main canal, with no control diversions.

The District records show that 47,183.4 acre-feet were diverted from these six drains in 1932, while the State records show a total of 49,907. The Farmers' Irrigation District carries water through its main canal for Northport Irrigation District, as indicated hereinafter. So far as the State is concerned, these drainage diversions were for Northport Irrigation District (part of the North Platte Project), inasmuch as the drains originate on the Pathfinder Irrigation District (also a part of North Platte Project); for the State Bureau of Irrigation agrees that drainage waters arising on a given project may be recaptured before reaching the stream from which diverted and reapplied on other portions of the same project, but does not recognize the right of a different enterprise to capture such drainage waters for its own use unless treated as an optional diversion, in which case the quantities so diverted are to be deducted from the permissible river headgate diversion.

So far as the United States Bureau of Reclamation is concerned, the Warren Act contract of 1912 provides that drainage waters may be considered as part of the total delivery, interchangeable with natural flow and storage water.

So far as the Farmers' District is concerned, these drainage diversions built by itself were for the purpose of overcoming river shortages, and all waters taken into its main canal are commingled and delivered to lands under both Farmers' and Northport Districts, regardless of origin. Differences in concepts of the ownership of drainage waters make it desirable that the question be settled, for it affects the operation of the Farmers Canal. The present position of the District management is that the diversion of drainage waters throughout the season is objectionable from an operation standpoint; but that the right to make such diversions for the benefit of Farmers' District lands during times of river shortage will be insisted upon; and that Farmers' District is not willing to concede to Northport District, a junior appropriator, the right to all this drainage water during times of shortage. In other words, the preference of the management would be to pass all drainage waters under the canal normally, and to hold the diversions as an auxiliary emergency measure.

Proposed Revision of Pathfinder Contract

Negotiations for revision are pending; therefore it will be desirable to review them briefly and to indicate their present status.

On January 15, 1931, Farmers' District made a formal request to the United States Bureau of Reclamation for revision of the portion of the Warren Act contract of 1912 relating to the schedule of delivery. The requested delivery was 100 second-feet on June 22, increasing uniformly to 935 on July 1, continuing at 935 to August 20, increasing to 1150 on August 20 and continuing to September 1, decreasing to 935 and continuing to September 22, decreasing uniformly to 100 on October 1, at which delivery discontinued; the total being approximately 180,000 acre-feet.

March 24, 1931, a supplemental request was made that storage water be allowed to be withdrawn on request during the irrigation season, the total not to exceed 100,000 acre-feet per year; as an alternative, that the request of January 15 be granted.

One of the points made by the District was that the Warren Act contract was signed while an appeal in the Enterprise case (Appendix A, No. 7) was pending, and that the schedule as drawn contemplated a possible natural flow right to only 28.5 second-feet as determined by the lower court; hence in view of the Supreme Court's reversal of the trial court's finding, the District's natural flow right of 1142-6/7 second-feet rendered the quantity of storage paid for considerably greater than actually proved necessary. Negotiations prior to execution of the contract appear to have centered around 100,000 acre-feet of storage at $5 per acre-foot; nevertheless the contract simply set out a schedule of delivery and made no mention of specific quantities of storage.

The District's request was circulated by the Bureau among other enterprises having contract rights with the United States on the river, and various protests and answers were filed and issues raised as to the interpretation and administration of Warren Act contracts.

On May 27, 1932, the Chief Engineer of the Bureau of Reclamation rendered a decision denying the request of the Farmers' Irrigation District of January 15, 1931, without prejudice to the District's right to apply for an amendment in accordance with views expressed in the decision. The supplemental request of March 24, 1931, was not referred to. The denial was based on the ground that the United States would be required to deliver 59,000 acre-feet more than the scheduled delivery during July, August, and September, which additional supply must come principally from project storage; and that the granting would be detrimental to the interests of other parties contracting for water supplies, and detrimental to the United States because of the absence of any obligation on the District's part to pay for the additional quantity of developed project water supply. The decision also dealt with the other issues raised.

The District appealed to the Commissioner of Reclamation on June 30, 1932. The Commissioner denied the request November 5, and the District appealed November 27 to the Secretary of the Interior. This appeal is still pending.

On January 27, 1933, the District made a new request for revision of the schedule, having been authorized by the Secretary of the Interior to make an amended application with the understanding that the pending appeal would be held in abeyance pending consideration of the amended application.

This latest request, which is now under consideration, asks for a schedule beginning with 200 second-feet on May 10, increasing uniformly to 950 on June 1, continuing at 950 to September 1, decreasing uniformly to 200 on September 20, on which date the schedule of delivery to be discontinued. The total amount so delivered being approximately 225,000 acre-feet, of which stored water shall not exceed 100,000 acre-feet.

Formal action has not been taken on this application, but the request is being studied by officials of the Bureau of Reclamation and an informal discussion has been held between the Superintendent of Power and the District officials. The entire subject of water supply for the Farmers' District is under consideration, including reservoir storage, river diversion, the Northport carriage contract, drainage diversion, and what projects shall be debited and credited with drainage waters so diverted.

Priorities Among Pathfinder Contracts

The Tri-State Land Company's contract of August 20, 1912, stated:

> "ARTICLE 12. It is further understood that the water users under projects of the United States Reclamation Service dependent for storage upon the said storage works shall be prior to the Company and to water users under its canal in right to the use of stored waters from the said storage works in accordance with Article 1 of the Warren Act."

The language in Section 1 of the Warren Act was to the effect that the Secretary of the Interior might contract for the impounding, storage, and carriage of water to an extent not exceeding the storage or carrying capacity provided in excess of the requirements of lands to be irrigated under any Federal reclamation project, "preserving a first right to lands and entrymen under the project." The question as to the effect this language should have upon the Farmers' Irrigation District's request for amendment of its Warren Act contract was raised in the discussions in which various enterprises along the river participated. The decision of the Chief Engineer of the Bureau disposed of this issue as follows:

> "It is not believed that the cited language from Section 1 of the Warren Act was intended to grant priority to the project irrigation districts over Warren Act contractors, but was intended as a direction to the Secretary of the Interior not to oversell the project water-supply."

The Interstate Water Situation

Interstate water problems on the North Platte have been pressing for solution for a number of years. Colorado, Wyoming, and Nebraska are involved, and the United States Bureau of Reclamation is interested because of existing Federal reservoirs and Warren Act contracts, as well as possible future projects. A general discussion of interstate matters is unnecessary here, except to point out:

(1) Statements were heard in the District that various Wyoming appropriators junior in point of time to the Farmers' District appropriation had been diverting water at times when the Farmers' District supply was short. The Nineteenth Biennial Report of the Bureau of Irrigation, Water Power and Drainage to the Governor of Nebraska, 1931-1932, just published, makes the following statement:

"The Pathfinder Reservoir is about two hundred forty miles (240) west of the Wyoming-Nebraska Line. Storage water mingles with natural flow water as it flows downstream, passing the headgates of many canals in Wyoming. During the seasons of 1931 and 1932 Wyoming water users diverted natural flow, regardless of priorities, and storage water to which they had no claim. This is a problem to be tolerated until such time as it can be disposed of by the States interested."

(2) On the contrary, Mr. John A. Whiting, State Engineer of Wyoming, stated to the authors that Nebraska appropriators had not been injured by Wyoming diversions, and that he and his assistants in administering the North Platte had respected Nebraska priorities.

(3) Mitchell Irrigation District lies entirely within Nebraska but diverts water in Wyoming, with a priority of June 20, 1890, thus junior to the Farmers' District's earlier priority. Litigation is pending, as stated hereinafter, over the Mitchell District's refusal to comply with closing orders of the State of Nebraska.

(4) The waters of the North Platte have not yet been the subject of interstate compact or United States Supreme Court decree. Active negotiations looking to a compact have been carried on from time to time, but apparently are not making headway at the present time, although the matter is being agitated. Without a compact or interstate adjudication the river water rights can not be considered as finally established.

(5) In the absence of a formal compact the Wyoming and Nebraska authorities and the Federal Superintendent of Power at Guernsey have been cooperating closely in the interchange of daily reports of water stages and other river data, thus substantially facilitating regulation of the river.

PREFERRED RIGHTS

The origin of the so-called "preferred rights" to water from the Farmers Canal has been stated in the chapter on "Organization and Financing." An examination of the early Miscellaneous Records of Scotts Bluff County in the office of the Register of Deeds at Gering, Nebraska, disclosed 34 recorded contracts between Farmers Canal Company and various individuals, carrying rights to an aggregate of 2,620 square inches of water. Thirty of these contracts were dated January 26, 1891; one March 25, 1889; one March 26, 1891; and two May 30, 1891. Three contracts recited as consideration the grant of a right-of-way for the Farmers Canal over certain lands; in all others the consideration was money at the rate of $100 per 40 square inches.

The typical contract provided that the Company would deliver, in perpetuity, a specified number of square inches of water continually flowing during the irrigation season from April 1 to November 1, at such points

along the canal not exceeding 40 miles from the point of diversion, and in such amount at each headgate provided by the second party (the contracting irrigator), as the latter might direct. It was stated that an "inch of water shall be a quantity flowing through an inch square orifice with a five-inch pressure." Details of the headgate were specified. The first party (the Company) agreed to hold the second party harmless through neglect to deliver the water. The Company waived all right to prorate the water in the canal, and agreed that "the said second party, heirs and assigns forever, shall be supplied with water first in preference over any and all subsequent stockholders in the said canal." Furthermore, it was "specially agreed that this perpetual water right, as above set forth, shall be forever free from any and all assessments or taxes of any nature or for any purpose whatsoever."

Those contracts in which the consideration was the grant of a right-of-way provided that the water should be used on specified tracts of lands, instead of leaving the place of use to the discretion of the grantee at any point under the first 40 miles of canal.

Upheld by Courts

The Tri-State Land Company refused to recognize these contracts, claiming that they were inequitable and illegal. Litigation followed, terminating in three decrees (Lincoln Land Company, Minor, and Morrill cases) in the Circuit Court of the United States, North Platte Division, rendered July 19, 1909, (Appendix A, Nos. 3, 4, and 5) in which the parties waived the right of appeal, and one decree in the Supreme Court of Nebraska (the Fenton case), dated August 11, 1911, (Appendix A, No. 6). In all cases the Tri-State Land Company was required to recognize the contracts. The four decrees involved a total of 2,120 square inches, after allowing for one contract included in two of the Federal decrees.

The Federal decrees perpetually restrained the company from demanding "any sum whatever on account of the water so to be furnished, or for maintenance, assessment, upkeep, or for any other purpose whatever for the use of water from the canal" to the extent of the contract right. The State Supreme Court decree held that each party to the action holding one of the contracts had "an easement in the canal in perpetuity, free from all costs and taxes for maintenance."

All four decrees specifically reserved for future consideration, should circumstances arise requiring it, the question of proration or equitable distribution of water among all users from the canal in case of shortage, as such contingency had not then arisen.

In an earlier case in the Nebraska Supreme Court (Appendix A, No. 2) the conveyance of the water right in one of these preferred-right contracts was attacked on the ground that it did not refer to a specific tract of real estate. The conveyance was upheld, however, inasmuch as water had been appropriated for an area including the land on which it was being applied by the grantee's successor in interest, and as the conveyance had been made before the passage of the irrigation law of 1895.

Appurtenance of Rights to Land

The Federal decrees provided that 840 square inches should be applied to certain described lands, and that the remaining 300 square inches involved in the decrees should be applied to any lands thereafter designated by the contract holders, or their successors, etc., lying under the canal and within a distance of 40 miles from the headgate.

The State decree, involving 980 square inches, designated the lands to which the use of the water represented by each contract should be appurtenant in perpetuity. This decree held that the contract rights were subject to any limitations made subsequently to their execution under the police power of the State; hence that they were subject to a beneficial use of the water and to a limitation of one second-foot for each 70 acres.

In two contracts not involved in the foregoing decrees, water to the extent of 100 square inches was made appurtenant to specified tracts of land.

Five other contracts aggregating 400 square inches of water were not involved in the decrees and made no mention of specific tracts of land on which the water must be used.

It thus appears that rights to 700 square inches were left "floating" so far as the court decrees and the original contract provisions were concerned, the only limitation being that the water be taken from the canal within the first 40 miles of its length. Presumably the holders from time to time have designated the lands on which they proposed to use the water; but records of such designation, if they exist, did not come to light in the course of this investigation. The District has a list of lands covered by preferred water rights, aggregating about 3,000 acres, lying principally under the first 10 miles of the main canal. This list includes some lands not designated in the foregoing decrees or in the two additional contracts in which lands were designated; and does not include certain lands designated in the decrees. In the majority of instances the descriptions coincide.

The District management of course has a record of all water customarily turned out for preferred rights at each headgate. It is not definitely known, however, whether the water so turned out is being used in all cases on lands entitled to its use.

Prorating Water in Time of Shortage

As stated above, the courts in upholding the preferred rights specifically refrained from deciding whether the holders should prorate with other water users under the Farmers Canal in time of shortage.

The Supreme Court of Nebraska, in its opinion in the Fenton case (Appendix A, No. 6), stated at page 491: "We must consider the contract holders equal in priority as against subsequent consumers, whose lands

lie beyond the ten miles of the original ditch, but perhaps subject to the statutory requirement that in time of scarcity the water shall be equally distributed. This, however, has not been argued and it is unnecessary to determine." The reference to distribution in time of scarcity is of course dictum, as the matter was not being litigated; but it is not exactly encouraging to those who would claim exemption from prorating during periods of shortage.

A suit in the District Court of Scotts Bluff County in 1928 involved this question (Appendix A, No. 10) and a temporary injunction was granted restraining the District from closing the headgate of the plaintiff preferred-right holder, whose contract had been upheld in one of the Federal decrees (Morrill case, Appendix A, No. 5). However, the final decree of the District Court simply confirmed the plaintiff's right in language similar to that used in the Federal decree, including the same reservation as to possible proration in time of shortage; and stated that no rights were being determined between the parties except to confer upon the plaintiff the rights and privileges conferred under the Federal decree in question, and to confer upon the defendant District the liabilities so imposed upon the Tri-State Land Company. In other words, the question of prorating in time of shortage was left undecided. No other litigation on this matter came to the attention of the authors in the course of the present investigation.

The area covered by preferred rights is a small percentage of the total area irrigated; nevertheless the District management feels that in times of water shortage, until the courts have decided otherwise, all users should be treated alike. In the latter part of the seasons of 1931 and 1932 the preferred-right lands were put upon a rotation basis in common with the assessed District lands. This was accomplished through informal understanding with the preferred water users and with no resulting litigation.

The District delivers water to the holders of preferred rights at their headgates in the main canal. The holders operate and maintain their own laterals, except where assessed lands and preferred lands are served from the same lateral, in which case the District assumes the responsibility.

Tri-State Preferred Contract

A contract executed in 1908 between the Tri-State Land Company and Brainerd Kellogg granted to the latter, in consideration of $1.00, "the perpetual right to the use of a sufficient supply of water to irrigate" a certain tract of 160 acres, not exceeding 1 second-foot to 70 acres, between April 15 and November 15, the right to run with the land. An annual payment of $1.00 per acre was required "in lieu of, and to include all charges of maintenance and other charges connected with the operation and maintenance of said main canal." It was provided that in times of water scarcity, water should be prorated with other consumers under the canal, with no claim thereby to a reduction in the consideration.

This is the only contract of this type of which the District management is aware, and is the only one found in a brief examination of the indexes to Volumes 1 and 2 of Miscellaneous Records of Scotts Bluff County.

The contract is still in effect. There is no distinction between the tract in question and assessed lands of the District in the matter of water delivery, the preference lying in the annual payment of $1 per acre and elimination from the assessment roll.

CONTRACTUAL RELATIONS WITH THE UNITED STATES AND WITH ADJOINING UNITS

Pathfinder Contracts

The Pathfinder schedule has been discussed in some detail. The Tri-State Land Company, in addition to the principal consideration of $500,000, agreed to pay annually one-fourth of the total operation and maintenance charges in connection with the storage works involved. A supplemental contract made in November, 1912, provided that this operation and maintenance charge should apply solely to Pathfinder Reservoir, and should not obligate the Company to pay any portion of such charges in connection with Minatare or other reservoirs from which water might be supplied to the Company. Delinquent payments were to bear 6 per cent interest. In case of delinquency the United States might refuse to deliver water to the Company or to any water user claiming through the Company until all payments due should be liquidated.

The contract of August 10, 1915, by which the District took over the Tri-State Land Company's interest in the Pathfinder contracts, provided for annual payments aggregating $475,000 extending from 1915 to 1934, inclusive, the last 14 payments being $28,500 each. No interest was included in these installments. This contract also embraced the provision for carriage of water to Red Willow Creek, discussed below under "Northport Carriage Contract."

The District met the payments due to 1922, inclusive, Delinquencies in making subsequent payments led to considerable friction between officials of the District and of the Bureau of Reclamation. Preparations were made to bring suit for collection, but the matter was dropped when the District agreed to enter into a new contract adjusting the charges and penalties due under the Pathfinder contract and three drainage contracts. This new agreement was dated July 15, 1927. It recited that the indebtedness of the District to the United States amounted to $356,758.39, of which amount interest was accruing upon $128,758.39. Adjusted payments were provided in annual installments of $28,500 due July 15 in each of the years 1927 to 1941, inclusive, and $22,467.66 in 1942. The total amount involved was $449,967.66, of which $356,758.39 constituted principal and $93,209.27 accrued interest on delinquent and deferred payments. The District agreed to make specific levies therefor and to set up a fund to be known as "The United States Contract Fund."

The District paid the amounts due in 1927 to 1930, inclusive, aggregating $114,000, and in December, 1931, paid $23,798.98 on the 1931 installment.

All construction charges due the United States for all purposes are represented by this 1927 contract.

Construction charge moratoriums. - A Congressional Act approved April 1, 1932, granted a moratorium upon charges due from projects constructed and operated under the reclamation law, upon acceptance of the act by the board of directors, by deferring the charge for 1931 and one-half of that due for 1932, the deferred payments to bear interest at a rate to be determined by the Secretary of the Interior. The Secretary fixed the rate at 5 per cent. Deferred charges on Warren Act contracts were to become payable after the last installment under existing contracts.

A Congressional Act approved March 3, 1933, extended the provisions of the 1932 moratorium to the balance of the 1932 construction charge and to all of that due for 1933, and provided that charges deferred under both acts should bear 3 per cent interest, which should be paid at the same time as the deferred principal.

Effect upon Farmers' Irrigation District. - The Secretary of the Interior advised the District under date of June 23, 1932, that the construction charges deferred under the then existing moratorium were extended and made payable in two installments, $28,500 on July 15, 1943, and $14,250 on July 15, 1944, and that the interest thereon at 5 per cent would be payable $1,425 on July 15, 1932, $2,137.50 on July 15, 1933, and $2,137.50 annually thereafter until payment of the principal.

The Secretary's letter further advised that the $23,798.98 theretofore paid on the 1931 charge would be applied in pursuance of Section 9 of the 1932 Act, which directed that such collections be credited upon succeeding payments as they should become due, including operation and maintenance charges. The amount was accordingly distributed $3,952.95 to the 1932 operation and maintenance charge, $1,425 and $2,137.50 to the 1932 and 1933 interest payments, $14,250 to the balance of the 1932 construction charge, and $2,033.53 to be applied on the construction charge due in 1933.

The District on August 17, 1932, protested the distribution of this charge, but to March 23, 1933 had not secured an adjustment. The protest was directed to the 1932 operation and maintenance charge, which appeared to include Guernsey Reservoir, and to the $1,425 interest charge calculated for payment in 1932.

Subsequently to the 1933 moratorium, the District received a circular letter from the Commissioner of Reclamation, dated March 7, stating that as the 3 per cent interest rate carried by the 1933 Act was retroactive and made payable concurrently with the principal, appropriate credit for the application of 1931 collections to interest under the 1932 Act would be given upon acceptance of the 1933 Act.

Operation of District System by United States

Pursuant to the bondholders' offer to cancel $203,000 of District bonds and to alter the terms of the remainder, the District agreed upon that consideration to convey to the United States in trust its irrigation works and systems, to be operated and maintained by the United States, expenditures therefor to be borne by the District. It was provided that the trust should terminate "upon full payment of all amounts due the United States and of all obligations on account of the bonds herein referred to, unless said trust is continued by mutual agreement of the parties hereto, but shall in any event terminate 30 years from the date of conveyance by the District to the United States."

The contract between the District and the United States was dated December 12, 1917, and was to become binding when the Secretary of the Interior should be satisfied that the undertakings constituting the consideration had been completed. The District executed the trust deed September 10, 1917. Several years of litigation ensued between the District and the bondholders over the time at which the reduction in interest should begin, and there were other delays in completing the undertakings, so that it was not until 1924 that the Secretary of the Interior agreed to accept the trust deed subject to certain interpretations in which the District concurred. The trust deed was finally tendered to the Secretary April 7 and accepted April 12, 1924.

The Bureau of Reclamation took over the operation of the Farmers' District system October 1, 1924. There was no change whatever in the management. The District employees were simply carried on the Bureau's payroll and operation accounts were handled through the fiscal agent of North Platte Project. This arrangement continued throughout the season of 1925. It was terminated by the Bureau on January 31, 1926, on the ground that no funds had been advanced by the District for operation purposes for January or February of that year as the Government had requested.

The bondholders made no objection to termination of the agreement. On the contrary, the terms upon which the Bondholders' Committee of the Tri-State Land Company agreed to the 1926 refunding included a statement releasing the United States and the District from all obligations to the Committee flowing from the contract of December 12, 1917, leaving the District free to abrogate or amend such contract in any manner. As a matter of fact, the taking over seems to have been a formality which was satisfactory neither to the District nor to the Bureau of Reclamation.

Present Status of Trust Deed Conveying System to United States

According to advice from the Commissioner of Reclamation under date of March 21, 1933, the records do not show that any release of the trust deed has been executed. None of the conditions upon which the 1917 contract provided that the trust should terminate have been fulfilled.

The title to the irrigation system of the District, therefore, is still in the United States in trust.

Northport Carriage Contract

The contract of August 10, 1915, under which Farmers' Irrigation District assumed the Tri-State Warren Act contract, also provided that the District would carry through its main canal from its intake to Red Willow Creek waters "owned, controlled, or used" by the United States or its assigns in a quantity sufficient to supply 250 second-feet at Red Willow Creek. This quantity was to be determined after deducting seepage, evaporation, and other losses, but was not to exceed an amount equal to 3 acre-feet per acre per season delivered at the land. Water was to be carried during the irrigation season extending from April 15 to October 1.

"The United States and its assigns" agreed to pay annually to the District, for the carriage of this water, "one-fifth (1/5th) part of such amounts as shall be expended each year by the said District for operation and maintenance of its works used in diverting and carrying the water of the United States or its assigns. The said operation and maintenance charges shall be estimated in advance by the Board of Directors of the District and shall include the estimated cost of all replacements, betterments and renewals, necessary in connection with the dam, intake, sluice-way, culverts and main canal of the District used in carrying the water of the United States aforesaid, together with any deficit arising from insufficient estimates of prior years, and less any surplus arising from over estimates of prior years."

It was further agreed that the terms of the contract should be binding upon the successors in interest and assigns of the parties.

An amendatory contract made December 6, 1921, made the foregoing contract applicable to the section of the District's main canal lying between Red Willow Creek and the diversion point of the Northport Canal in Section 15, T. 21 N., R. 51 W.

The main canal of the Northport Division of North Platte Project, which is the "Northport Canal" of the preceding paragraph, together with other irrigation works serving the Division, was transferred by the United States to Northport Irrigation District by contract dated November 24, 1926, effective December 31 of that year. The contract provided that the Northport District as assignee should carry out all contract obligations of the United States affecting the Northport Division and made particular reference to four contracts between the United States and Farmers' Irrigation District - the carriage contracts of August 10, 1915, and December 6, 1921, the Indian Creek wasteway contract of June 6, 1916, and the Red Willow outlet contract of December 6, 1921. It was further stated:

"The payments to the Farmers' Irrigation District for the carriage of water as provided in the contracts of August 10, 1915 and December 6, 1921 referred to above shall be made by the Northport District as assignee of the United States and in so far as is permitted by law, and is not otherwise herein provided, the District shall have all rights and privileges under any and over all such contracts as the United States now has or would have if this contract were not in effect."

Operation of Contract. - Farmers' District continued to carry water to the Northport headgate after the transfer of the Northport system to local control. It is estimated by the Farmers' management that 355 second-feet must be diverted at the river intake in order to deliver 250 second-feet to the Northport Canal. The management considers this carriage contract burdensome in that it costs more than 20 per cent of the total operation and maintenance cost; that the proportion of water at the river intake belonging to Northport (355 second-feet) is more than 20 per cent and increases gradually to approximately 50 per cent at the Northport headgate, owing to deliveries of Farmers' District water all along the line. Of course this disadvantage is offset by the several drainage diversions to whatever extent it is eventually determined that the drainage water belongs to Northport.

Records in the office of the State Bureau of Irrigation show that the water supply of Northport District in 1932 consisted of 15,715 acre-feet of storage water and 14,069 of natural flow diverted through the Farmers' headgate, and 49,907 acre-feet diverted into Farmers Canal from six drains.

Farmers' Irrigation District is not ready to concede that this drainage water belongs to Northport. The Farmers' water record for 1932 shows that water diverted for Northport was 24 per cent of the total quantity diverted for both districts from all sources that year, and that Northport received 24 per cent of the aggregate net deliveries.

Controversy over carriage charges. - The amount payable by Northport Irrigation District as its share of operation and maintenance of the Farmers Canal for 1932 is in dispute. Farmers' District submitted to the Bureau of Reclamation on May 14, 1932, a statement of the estimated costs for the ensuing season, together with a statement of actual costs for 1931. One-fifth of the 1932 estimate, less a credit for excess advanced in 1931, left a balance due of $7,211.13. Northport District refused to pay the entire balance claimed as due, on the ground that items not contemplated by the carriage contract were being included.

The attorney for Northport District, in a letter to the board of directors of that District, took the position that the language "said operation and maintenance charges . . . shall include the estimated cost of all replacements, betterments and renewals" seemed to define clearly the operation and maintenance charge to which the United States and its assigns should be subject, and that consequently items of annual expense other than replacements, betterments and renewals were illegal charges against Northport.

Negotiations failed to bring an agreement. The principal dispute seems to have been over the matter of overhead; that is, whether overhead in general is properly chargeable to operation and maintenance under the contract, and whether such items as election expense and cost of refinancing (specifically travel to Washington) should be or actually were included in the estimate.

Status of Litigation. - Northport District claimed that $1,250.83 of the $7,211.13 was not a legal charge. Farmers' District threatened to withhold delivery of water for non-payment, whereupon Northport brought suit in the District Court of Scotts Bluff County August 16, 1932 (Appendix A, No. 13), and secured on that date a temporary restraining order. Northport had paid $4,000 on the 1932 estimate and admitted $1,960.30 still due. A temporary injunction was granted August 24 upon payment of the admitted $1,960.30 into court for the benefit of defendant, thus leaving $1,250.83 as the amount in controversy in the suit.

Farmers' District moved to make the plaintiff's second amended petition more definite by alleging whether the operation and maintenance charges for 1932 were estimated in advance as required by Article 7 of the contract, and if so the amount, and whether plaintiff paid any part of the estimate and the amounts and dates of payment. The effect of this would have been to bring to an issue the matter of what items of expense should or should not have been included in the estimate. However, although the motion was granted, the allegations were not made, with the result that the injunction was dissolved February 1, 1933, and the action dismissed.

Notice of appeal was filed February 7, 1933. The question to be decided on the appeal will be the right of Farmers' Irrigation District to withhold delivery of water. Presumably the question as to what items of expense are properly chargeable to Northport will not be in issue.

Cooperative Drainage Contracts

The location of Farmers' Irrigation District has led to several drainage undertakings in cooperation with neighboring units. Pathfinder Irrigation District, with its 90,000 acres of irrigated area, lies above and adjoining Farmers' District throughout practically the entire length of the latter from west to east. Between Farmers' District and the river, in turn, throughout the District's entire length, is a series of smaller irrigation enterprises. A number of important drainage channels carrying storm and seepage waters cross this group from north to south.

A contract between the United States and Farmers' Irrigation District dated June 16, 1917, provided that the United States would construct a drainage ditch to the river from the intersection of Farmers Canal with Nine Mile Draw, for the joint use of the parties as a wasteway and drainage outlet. The District was to reimburse the United States for 40 per cent of the cost of construction in ten annual installments. The District was to operate and maintain the ditch and to be reimbursed annually by the United States for 50 per cent of the cost.

Drainage and wasteway contracts with the United States were also made in connection with Indian Creek, Wild Horse, Minatare (modification of the Nine Mile), Leavitt, Alliance, Moffitt, Winters Creek, and Red Willow Drains. Other parties to certain of these agreements included Alliance Irrigation District, City of Bayard, Minatare Drainage District, Winters Creek Canal Company, Drainage District No. 1, Enterprise Irrigation District, Morrill County (in respect to bridges across drains), and the Chicago, Burlington & Quincy Railroad Company (in respect to a crossing).

The benefits accruing to the several parties from the drainage ditches were determined and the costs of construction apportioned accordingly. For example, in case of Wild Horse Drain the cost of the portion extending from Farmers Canal to the City of Bayard was apportioned equally between the United States and Farmers' District; the portion extending thence to Alliance Canal, 28 per cent to the United States, 28 per cent to Farmers' District, and 44 per cent to the City; the remainder, 25 per cent to the United States, 25 per cent to Farmers' District, 39 per cent to the City, and 11 per cent to Alliance Irrigation District.

In most cases Farmers' Irrigation District contracted to operate and maintain the ditches from its own main canal to the outlets, to be reimbursed proportionately by the other parties in interest. Minatare Drainage District, however, assumed this duty on a drain carrying its own waters only; and in case of the Winters Creek drainage outlet the several irrigation organizations undertook the operation and maintenance of those portions of the channel lying within their respective territories. The obligations of the United States to reimburse Farmers' District for operation and maintenance expenditures on the drains benefiting the Interstate and Northport Divisions have been assumed, respectively, by Pathfinder and Northport Irrigation Districts.

The earlier agreements provided that as between the parties the United States should have the ownership, use, and disposal of all waters discharged into and conveyed by the drains. In the Winters Creek contract, however, the United States reserved the right to all waters flowing into the drain from the North Platte Project, and as to the balance simply withheld consent to the diversion of any water from the channel by the other parties excepting waters the parties might be entitled to by law. Furthermore, the subsequently executed Red Willow contract provided that the United States and Farmers' District should each own the waters discharged into the drain from its own lands and should divide all other waters in the channel approximately one-third to the former and two-thirds to the latter.

Two contracts in 1924 provided that the United States would construct certain drainage works for Farmers' District, the cost to be advanced by the District upon monthly estimates. These were simply agreements for the use of one of the Bureau's dragline excavators and crews.

Adjustment of Indebtedness to United States on Account of Drainage. - The balance of the Farmers' District indebtedness to the United States on account of the Wild Horse and Nine Mile drainage contracts, as of July 15, 1927, was refunded into the contract of that date which adjusted the Pathfinder Warren Act charges. No construction charges due the United States on account of drainage are now outstanding other than those included in the 1927 contract.

Litigation with City of Bayard. - Farmers' Irrigation District filed a petition against the City of Bayard in the District Court of Morrill County in December, 1930 (Appendix A, No. 11), for the recovery of operation and maintenance costs on the Wild Horse Drain. The petition alleged that the District had been operating the drain from 1920 to 1930, inclusive, at a total cost of $51,958.04, of which the City's share according to the Wild

Horse Drainage contract was 31 per cent; but that the City had paid no part of the cost except that for 1924 amounting to $693.93. A demurrer on the ground of operation of the statute of limitations was sustained as to the years ending with 1925. Expenditures for 1926-1930 aggregated $6,570.06, of which 31 per cent is $2,036.72.

The City alleged that the contract was not binding on itself on several grounds, such as lack of an estimate of cost of construction in behalf of the City, failure to advertise for bids as required by law, no appropriation by the City, no ordinance authorizing the contract, no ratification by the voters, and substitution of an independent contract in 1924 under which the City contributed $5,000 of which $693.93 was turned over to the District by the United States.

The District replied that the City Council, City Engineer, inhabitants, and taxpayers had participated in negotiations leading to the contract, procuring of rights of way, and effectuating the purposes of the agreement; that the City had benefited from the contract, and was estopped from questioning its validity.

Issues have been joined and the case is now ready for trial.

The District is relying upon the fact that in 1930, in the Federal District Court, the United States recovered from the City its proportionate part of the cost of construction under this contract, with interest, after the City had paid two installments and failed to pay the others.

In connection with the allegation in the City's reply concerning substitution of an independent contract in 1924, the authors of this report are advised by Mr. W. J. Burke, District Counsel of the Bureau of Reclamation, as follows:

> "During the Spring of 1924, it was necessary to make urgent repairs to the drain in order to avoid flood hazard to the City of Bayard. A difficulty was encountered in that the officials of the city refused to accept any liability under the contract of May 31, 1918, among the United States, Farmers' Irrigation District, and the City of Bayard. As a result of the negotiations the suggestion was made and adopted that the City of Bayard, the district, and the government advance a sum of money for the purpose of providing the funds to make the needed repairs. Accordingly, each of the parties advanced the sum of $5,000.00, and the total of $15,000.00 was expended in the repair work. This money was advanced under a verbal agreement among the parties, and was never reduced to writing. It is this transaction to which reference is made in the answer of the City of Bayard in the suit filed against it by the Farmers' Irrigation District."

The Bayard and Northport cases (Appendix A, Nos. 11 and 13) have been discussed in some detail. Two other pending cases are as follows:

Mitchell Irrigation District Case

This case (Appendix A, No. 12) instituted by the State of Nebraska against Mitchell Irrigation District may have some bearing upon the water right of Farmers Canal. Farmers' Irrigation District is not now a party, but may possibly become involved.

The Mitchell Canal heads on North Platte River in Wyoming, a short distance west of the Wyoming-Nebraska State line. It serves the lands of Mitchell Irrigation District lying wholly within the State of Nebraska. The canal has an appropriation for 194.29 second-feet with priority of June 20, 1890, adjudicated by the State Board of Control of Wyoming. No appropriation has been made under the laws of Nebraska.

This situation - diversion in Wyoming and use in Nebraska - has led to controversies with the water administrations of both States. Proof of appropriation was presented to the Wyoming Board of Control in 1906, but was not accepted until April, 1920, for the Attorney General of Wyoming had advised the Board of Control that it had no jurisdiction over an appropriation solely for the irrigation of lands in another State. The District appealed to the courts. The Supreme Court of Wyoming (State ex rel. Mitchell Irrigation District v. Parshall, State Engineer, et al., 22 Wyo. 318, 140 Pac. 830) held that in such case the Board of Control had jurisdiction and should act upon the proof and determine whether under the law the applicant had a water right.

When the Enterprise Irrigation District brought action to establish its appropriation against that of Tri-State Land Company and others (Appendix A, No. 7), numerous organizations including Mitchell District filed cross-petitions to quiet title to their appropriations. The district court in its original decree concluded that it had no jurisdiction over the Mitchell cross-petition, owing to the fact that the canal headed in Wyoming, and accordingly dismissed it, to which the District excepted. The Supreme Court of Nebraska in its mandate stated that Mitchell District had prosecuted a cross-appeal and named Mitchell among the defendants against which costs should be taxed; but in its opinion the Supreme Court stated the lower court's finding as to the Mitchell cross-petition and made no comment concerning it. In view of this the status of Mitchell District with reference to the proceedings establishing the Tri-State's earlier priority appears uncertain.

Controversies between Mitchell District and the Bureau of Irrigation of Nebraska culminated in an order by the Department of Public Works on August 21, 1931, that the diversion works be closed on account of an insufficiency in supply for nine prior Nebraska appropriators including Farmers' Irrigation District. Mitchell refused to comply, whereupon the Attorney General filed a petition in the District Court of Scotts Bluff County

asking for a determination of the rights and status of Mitchell District and as to whether its system is subject to control by the State of Nebraska. The latest pleading on file in this case is a motion filed by the plaintiff September 9, 1932, to strike certain portions of the defendant's answer.

Intervention in this action is being seriously considered by Farmers' Irrigation District. Farmers' officials feel definitely that Mitchell Irrigation District, a junior appropriator, occupies an unduly advantageous position on the river under present conditions and that control by the Nebraska authorities would protect the Farmers' 1887 priority more effectively during the critical low-water stages of late summer.

Mitchell Drainage District Case

This case (Appendix A, No. 14) involves the Wet Spottedtail Drain, which discharges directly into Farmers Canal without the medium of a control structure. There is a waste gate in the lower bank of the canal opposite the mouth of the drain, with an overflow structure (seldom or never used) a short distance away. It is stated that with the exception of a brief period, the waste gate had not been in use for a number of years prior to 1932, the practice having been to carry the drainage waters down the main canal and discharge them during the nonirrigation season into the wasteway east of Mitchell. The result has been the washing of silt into the main canal each year and the deposit of the silt in the form of a long mud bar in the canal due to the sudden change in course and the flat grade.

In 1932 the District management had the gate opposite the drain opened in order to pass the drain waters directly across the canal and thereby remove the mud bar. The result of this unaccustomed disposal of Wet Spottedtail waters was to raise the water table in the Mitchell Drainage District and the City of Mitchell below the canal.

The Mitchell Drainage District brought suit October 29, 1932, and secured a temporary restraining order. This, however, was dissolved without prejudice December 12 owing to the formation of ice in the wasteway east of Mitchell and resulting impossibility of using it to carry the drain waters from the canal. The action was dismissed February 4, 1933, and motion for a new trial was overruled February 21. The Drainage District has filed a cost bond for the purpose of perfecting an appeal to the Supreme Court.

The court took the ground, in dismissing the action, that the Drainage District had not obtained a prescriptive right to have the drainage water carried down the Farmers Canal, nor could it claim that the new water course had by the lapse of time become the natural water course of the drainage water; and that the Farmers' District was not estopped to use the waste gate in controversy.

The outcome of this action may have a bearing upon the District's plans at Akers Draw as well as Wet Spottedtail; for if the right of the District to pass these waters is upheld on appeal, the proposed right of way and channel to the river from the crossing at Akers Draw may not be required.

MANAGEMENT AND OPERATING ORGANIZATION

The District is governed by a board of three directors. The District is divided into three divisions, and each year one of the divisions elects a member of the board to serve for a three-year term. The president of the board takes an active part in the management.

The secretary-treasurer receives $150 per month. The directors and the assessor receive the statutory allowances per diem. The attorney does not receive a retainer fee, but is compensated for time spent on the District work.

A manager is employed at a salary of $250 per month, and a stenographer at $60 per month.

The regular operation and maintenance force consists of the following:

3	superintendents at $150 per month
3	foremen at $90 per month
31	ditch riders and gate tenders at $80 per month
2	repair men at 20¢ per hour
2	dragline men at 30¢ and 50¢ per hour
2	Ruth machine men at 30¢ and 45¢ per hour

In addition, during the months of April, May, and June some 60 to 125 men with teams are employed for cleaning and repair work. Common labor has recently been paid 20 cents per hour, and teams 2-up 35 cents and 4-up 50 cents per hour.

ENGINEERING FEATURES

Description of Irrigation System

The following description is compiled principally from material prepared several years ago by B. C. Donham, engineer, - who as Construction Supervisor participated in a portion of the construction work, - supplemented by other data.

The headworks consist of a diversion dam across the North Platte near the Wyoming-Nebraska State line, with a wasteway and headgate built into the dam at the north end, on which construction was begun in 1906. The old wooden headgate structure through which water was diverted prior to construction of the dam has been kept in repair for use during periods of high water.

The diversion dam is of the needle type. It is about 900 feet in length, and is supported upon round piles with a concrete deck. There is a cut-off 25 feet in length consisting of a row of triple-lap sheet piling driven down on the upstream edge of the deck and single sheet piling on the downstream edge. The concrete deck covers the entire pile foundation and extends below the dam to provide an apron for prevention of tail-water scouring. The downstream extension of the concrete, however, has not

always proved adequate to prevent scouring and has consequently been supplemented by a further downstream extension in the form of a timber apron hinged at the deck. The frame for the needle structure is anchored to the concrete deck. By removing any desired number of needles, the water level above the dam is kept under control. By removing needles some distance apart, excessive flow through the dam at any one point may be avoided.

Extending from the south end of the needle dam across adjacent bottomland is an earth dam or dyke. Water in this low area is thus diverted into the main channel and to the concrete structure.

The wasteway at the north end of the dam has three steel Taintor gates set in heavy concrete, and a concrete apron extending far below the dam. The wasteway is designed to prevent the accumulation of sand in front of the headgate. The headgate is of massive reinforced concrete and is provided with eight steel Taintor gates of adequate capacity. The old wooden headgate is located just above the concrete headgate. Auxiliary use of this older structure has the advantage of passing water over the gates under flood conditions practically free from sand.

Regulation of the water supply is effected at a check and spillway located on the main canal about two miles below the intake. This structure has five steel Taintor wastegates and seven steel Taintor checkgates, all set in massive reinforced concrete masonry similar to that of the headgate. Sand passing through the river headgate is deposited in the canal above the check and spillway and is washed away from time to time by opening the gates and passing a maximum flow in from the river and out through the spillway. The use of this structure, with the large excess capacity in the canal above it, renders frequent adjustment at the dam and headgate unnecessary.

A large wasteway is located below Mitchell. Although this is a considerable distance from the headgate, the area irrigated from Farmers Canal above this point is only a small fraction of the total district area. An important advantage of the location of this wasteway, therefore, is that water may be brought to it regardless of demand below, so that deliveries upon demand below this point may be made 12 to 18 hours earlier than would otherwise be the case. There are several other wasteways which are useful when for any reason it is desirable to empty the main canal quickly. A large wasteway near the lower end of the system discharges surplus water into Red Willow Creek.

Reinforced concrete bridges cross the canal at the headgate and at the check and spillway. A concrete bridge is now under construction at the intersection of the State Highway with the lower part of the canal. Bridges of substantial character cross the canal at the many county road crossings, the maintenance of which in Scotts Bluff County has been taken over by the County with a considerable saving to the District. Practically all of the larger structures are now permanent in character.

All permanent laterals are owned and maintained by the District. The principal laterals are provided with concrete weirs, drops, culverts, and outlets, and heavy wooden bridges. The District in addition to ordin-

ary maintenance work has been gradually replacing the many temporary wooden structures with concrete structures of good design.

There are 80 miles of main canal, 250 miles of laterals, and approximately 3,200 structures.

The main canal, as constructed, was designed for the following capacities:

		Second feet
Sec. A - To Mile 2	- Headgates to spillway	1,827
" B - " " 33½	- Spillway to Winters Creek	1,755
" C - " " 45½	- Winters Creek to Nine Mile Creek	1,577
" D - " " 52	- Nine Mile to end of Tri-State original construction	1,440
" E - " " 80	- Designed for actual requirements, reducing in size as end of main canal is approached.	

Condition of System

Practically the entire length of the main canal was traversed by the authors at least once during the course of the investigation, and portions two or three times. The services of Mr. Leslie Bowen, Assistant Irrigation Engineer of this Bureau, were enlisted in analyzing the District's maintenance problems and in preparation of the following discussion:

"Generally speaking, the condition of the main canal is good. There are of course small sections here and there where the banks are being worn away. Occasionally places will be found in the bottom where scouring has been severe and holes gouged out. While it would be preferable to avoid such conditions, one should not become too much alarmed at their presence, and serious damage is not anticipated provided they are not permitted to continue indefinitely. It appears that those in charge of operating the District system are aware of the problems involved and are taking proper precautions to prevent small troubles from developing into larger ones.

"The canal was apparently located on the basis of making the sections of 'cut' balance the sections of 'fill.' This procedure in a rolling country such as that in the North Platte Valley results in a very irregular canal. Curves are numerous and of varying degrees of curvature.

"Winds move considerable quantities of soil into the canal. Banks slough off here and there. These encroaching materials, together with those already present in the water, are transported downstream by the water and deposited elsewhere along the canal.

"Sand bars usually accumulate at curves. These bars deflect the current first to one bank and then to the other, with resulting erosion of the banks. Finally erosion reaches a point at which additional bank protection becomes necessary.

"In order to meet these conditions as they develop, those in charge of the system are installing jetties at certain vital points and at other points are lining the inner slopes of the canal with gravel.

These jetties are merely short sections of fence - either of closely woven hog wire, or the willow-type fence. Usually the jetties are placed parallel to the canal bank, but occasionally are projected downstream into the canal at an angle of 20 to 45 degrees from the bank. The purpose of the jetties is to destroy the stream eddies and thus bring about the deposition of sand and silt behind the fence, and to hold the current in the center of the canal. Much constructive work along this line has been accomplished.

"Where gravel lining is employed, the canal banks are first dressed to the proper slope. Next the gravel is spread in a layer of about two or three inches in thickness. Experience has shown that after a year or so enough fine material has been deposited to cause the gravel to become more or less cemented in place, thus making a fairly hard surface and greatly retarding the effectiveness of the erosive forces.

"Holes which develop in the bottom of the canal are repaired by filling with alternate layers of weeds, rock, and earth.

"Deposits of gravel are to be found at many convenient locations along the entire length of the canal. This use of gravel in canal lining should be encouraged, at least until a better and more economical method can be found. Gravel delivered to point of use costs about 60 cents per yard.

"The gopher is an ever-present pest, and his work causes a serious menace in the form of canal breaks. The evidence indicates a large number of these rodents in and along the canal banks. The management is thoroughly alive to the situation and is engaged in a systematic campaign of poisoning.

"Additional spillway capacity should be provided at suitable points along the canal. One or two additional structures would add materially to the safety of the system. While no serious results have occurred from heavy storms to date, it is not safe to assume that there will be none. Such storms do occur in this area. Ten to twenty thousand dollars should be sufficient for these additional structures."

Problem of Cross Drainage

Probably the most serious problem of canal maintenance lies in dealing with the cross drainage. Reference to the accompanying maps will disclose the many drainage channels intersected by Farmers Canal. Certain of these channels drain large areas and provide the sole outlets for potential storm run-off of considerable magnitude. In other cases the storm menace causes little concern, either because the watersheds are small or because of the likelihood of wide distribution of flood waters before reaching the canal. Nearly all of the drains flow throughout the year, discharging waters stored in the Pathfinder lands as the result of irrigation and rain waters from both Pathfinder and higher lands, together with waters reported to be wasted from irrigation laterals.

Unquestionably the cross-drainage problem has developed greatly since the construction of Farmers Canal; the situation is very different

from what it was when the canal was built across these depressions. This, the inevitable result of the installation of a large irrigation system (the Pathfinder) on adjacent higher-lying lands, is a common experience in the West. The Farmers' system itself has contributed in turn to the water-logging of lower lands. Much money has been expended in providing for cross drainage along the main canal and considerably more must yet be spent. The safety and efficient operation of the canal depend upon proper handling of the cross-drainage water.

In August, 1932, a break in the Pathfinder Irrigation District main canal near Sheep Creek Drain released an unprecedented flood down the drain for many hours. The capacity of the Farmers underpass was entirely inadequate to carry it, but ample warning enabled the management to reduce the headgate diversion and to prepare to take the excess flood waters into the canal through two openings lined with heavy canvas. The canal was saved, but the occurrence emphasized forcibly the need for an ample underpass at the Sheep Creek crossing and additional capacity at some of the others.

The cross-drainage problem is complicated by the diversion of drain waters into Farmers Canal for irrigation purposes. It would be simpler from a purely maintenance standpoint to install underpasses of adequate estimated capacity and let it go at that. But drain waters are needed for irrigation during times of river shortage. Consequently diversions are maintained on four drains (Sheep Creek, Tub Springs, Dry Spottedtail, and Alliance), while two others (Akers Draw and Wet Spottedtail) now open directly into the main canal. These direct openings are a decided disadvantage from a canal-operation standpoint, for they cause the building of mud bars in the canal bottom and reduce the capacity correspondingly.

Necessary work on cross drains. - Mr. Leslie Bowen has prepared estimates of cost of such work as the result of his own observations. His figures do not agree entirely with those of the District management, principally because he considers the required work at water-logged crossings more expensive than the District has estimated. Mr. Bowen's summary of the situation and estimates follow:

"In general, cross drainage can be considered as being of two classes:

1st - Open channel where drainage of the areas is confined to a well defined channel. The lands adjoining the canal have good drainage and are high and dry the entire year. Sheep Creek is a good example.

2nd - Swamped or water-logged areas. There may or may not be a well defined channel. Drainage is poor and the adjoining areas are constantly wet, with the soil soft and spongy. Akers Draw and Wet Spottedtail are good illustrations.

"Where a canal intersects cross drainage of the open-channel type, about all that is necessary is to provide ample capacity for passing the

maximum flow of water expected. Construction of an underdrain is not difficult. If, however, the cross drainage is of the swamped and water-logged nature, construction of the underdrain or underpass may prove very difficult and consequently involve considerably greater expense. Drainage of the immediate area becomes necessary. Without proper drainage there usually results a continued settlement and sloughing away of canal banks. With the operation of the Pathfinder Canal there results a greater need for increased capacities of practically all underpass structures.

"There are a few sections along the Farmers Canal where cross drainage greatly impairs the safety of canal operation under full capacity. Akers Draw is a good illustration of this. At Akers Draw, we have a badly bogged condition. The canal banks are constantly wet. These wet conditions undoubtedly contribute much to the bank settlement and sloughing which are so pronounced. Maintenance costs are high. The hazard of having the canal banks slough "in" or "out" and thus lead to a serious break is ever present. Wet Spottedtail, where boggy conditions exist, is a problem of considerable importance also."

Estimated Costs for Needed Cross Drains,
Exclusive of Diversion Structures and Channels

1. Sheep Creek - (Open Channel)		
Additional underpass	$ 6,700.00	
Dragline work and riprap	5,000.00	$11,700.00
2. Akers Draw - (Bogged Area)		
New underpass and drainage for canal	14,800.00	
Rebuilding downstream bank	4,000.00	18,800.00
3. Dry Spottedtail		
Underpass - good		
Rock fill for outlet of structure .	1,000.00	1,000.00
4. Wet Spottedtail - (Bogged Area)		
New underpass and drainage	20,000.00	
Repair of canal banks	3,000.00	23,000.00
5. Tub Springs - (Open Channel)		
Underpass - good		
Cutting outlet channel deeper and rock fill	800.00	800.00
6. Alliance Drain - (Open Channel)		
Additional underpass	6,200.00	6,200.00
Total for all crossings		$ 61,500.00

The foregoing estimates for Akers Draw and Wet Spottedtail do not include allowances for right of way and channel to the river. The District's estimate for such items in case of Akers Draw is $16,000, and in case of Wet Spottedtail it is $18,900 for "underdrain and gates, including right of way."

Necessary work on drain diversions. - Diversions on Akers Draw and Wet Spottedtail are necessary if water is to be taken from the drains after the installation of underpasses. District records show 3,252 and 4,366 acre-feet diverted from these respective sources in 1932. The diversion on Dry Spottedtail is temporary and part of the channel is obviously in poor condition. Additional work appears necessary on the other diversions also, notably at the Sheep Creek diversion channel outlet. The District's estimates of cost of work necessary on the diversions are as follows:

1. Sheep Creek:		
Reconstruction diversion outlet	$ 375.00	$ 375.00
2. Akers Draw:		
Dragline work and new diversion	5,250.00	5,250.00
3. Dry Spottedtail:		
Concrete work headwalls, wings, etc.....	1,200.00	
Safety spillway on diversion lateral ...	450.00	
Gates in place	400.00	
Back-lash protection	250.00	
Channel protection	700.00	3,000.00
4. Wet Spottedtail:		
New diversion and canal	6,000.00	6,000.00
5. Tub Springs:		
Repair structure	150.00	
Gates and installing	250.00	
New bridge	150.00	550.00
6. Alliance:		
Diversion safety	600.00	
Gates at diversion	200.00	800.00
Total for all diversions		$ 15,975.00

Waste from Pathfinder Irrigation District Lands

The authors' attention was called to a number of places at which waste from adjacent areas in Pathfinder Irrigation District was being discharged into the main Farmers Canal. Some of the inlets were sections of pipe, and others simply cuts in the upper bank. All were of small capacity, but were stated to be of sufficient influence in the aggregate to cause operation difficulties. It was said that when many irrigators in position to waste water through these outlets ceased irrigating at the same time, and of course without notice to the Farmers' management, the unexpected inflow made many successive changes necessary along the canal and for the time being interfered with scheduled deliveries.

These inlets have apparently been installed from time to time over a series of years. In no specific instance were the circumstances of the origin learned. However, it is not reasonable to assume that they were installed in all cases against the protest of Farmers' District, in view of the consistent energy which the management appears to have used for many years in protecting the District's interests. But irrespective of origin, the fact remains that the inlets are in place and are a source of aggravation to the present management, and that no satisfactory way of eliminating or controlling them has yet been devised. Presumably the parties to be dealt with are individual farmers in Pathfinder Irrigation District rather than the management of that District, for it is waste from individual farms that is involved.

Operation, Maintenance, and Betterments Costs

A statement prepared in 1932 by the District shows the total cost of operation and maintenance on the Farmers' Irrigation District works for the years 1913 to 1931, inclusive, to have been $2,655,229.75. Of this amount $549,715.26 was for betterments and $66,912.32 for Pathfinder operation and maintenance charges. The average of $2,655,229.75 for the 19 years is $139,749 per annum.

The same statement shows the cost of betterments to have been:

Diversion works and main canal	$337,051.81
Laterals	79,400.00
Drains used by United States	127,263.45
Collecting drains	6,000.00
	$549,715.26

It was stated also that of the cost of drains used by the United States ($127,263.45) the District still owes the United States $43,258.39.

The 1932 audit shows the cost of betterments to have been $549,715.26 to 1930, inclusive, $7,035.34 in 1931, and none in 1932, making a total of $556,750.60. Costs to 1929, inclusive, were arrived at by appraisal.

Operation and maintenance expenditures beginning with 1918 are shown by several District audits prior to that of 1932 as follows:

1918	$187,806.84
1919	245,220.92
1920	218,466.55
1921	156,297.53
1922	100,936.78
1923	102,459.72
1924	97,500.27
1925	127,532.86
1926	116,527.88
1927	115,491.97
1928	97,252.39
1929	99,464.98
1930	99,354.36
1931	90,929.73

The 1932 audit makes the following comparison of "total expenditures for operation, maintenance and betterments to the system:"

1928	$118,077.37
1929	106,610.96
1930	95,652.75
1931	93,212.67
1932	61,833.02
Last 5 years' average	$ 95,077.38
Maximum year (1919)	245,220.92
Minimum year (1932)	61,833.02

The District Manager advises that the 1932 operation and maintenance account included betterments, such as enlargement of structures, replacement of structures with concrete or other more permanent material, and entirely new structures, but that in previous years the operation and maintenance account was separated from the betterments account.

The 1932 operation and maintenance costs as shown by the audit may be summarized as follows:

Field costs:			
Canal system:			
Diversion dam and sluice	$ 1,700.28		
Main canal	20,293.75		
Laterals	18,731.05	$ 40,725.08	
Wasteways and drains:			
District	3,780.23		
Cooperative drains	1,384.73	5,164.96	
Equipment		1,908.63	$47,798.67
General overhead			22,159.56
Pathfinder O. & M. charge			3,952.95
TOTAL			$73,911.18
Deductions:			
Main canal, one-fifth interest		$ 6,139.94	
Cooperative drains		980.53	
Sundries		978.39	8,098.86
NET TOTAL			$65,812.32

Included in the "general overhead" is a depreciation charge of $3,979.30. If this be deducted from the net total, the balance is $61,833.02, which is the figure shown in the auditor's five-year comparison referred to above.

Reduction in 1932. - It will be noted that the 1932 costs were approximately one-third less than in either of the two preceding years. This is stated to be due to decreased costs of labor and materials, - particularly labor. The field costs for labor in 1932 totaled about $37,000, or 77 per cent of the total field costs.

The 1932 operation season appears to have been satisfactory. The directors went on record as being well satisfied, and no criticisms from farmers came to the attention of the authors.

Under present conditions it is desirable and necessary to hold operation costs to the lowest figure consistent with safety and efficiency. This goes without saying. On some projects, however, there is apparently a tendency to cut below the safety limit. The capital investment in the irrigation and drainage works of Farmers' Irrigation District exceeds two and one-half million dollars, entirely aside from the cost of water rights

and the individual investments in agricultural lands and other property dependent upon the irrigation works. The main canal requires constant supervision and care to keep it in safe operating condition. In the judgment of the authors of this report the management is keenly alive to its responsibility and is taking every means of preserving the system which it considers practicable. Nevertheless the fact remains that considerable money must be spent at the cross-drainage channels and elsewhere, as already indicated; and to those who would press for further economy in supervision and maintenance it should be emphasized that a single break along this 80-mile canal may cost far more in repairs, damages, and loss to crops than the few cents per acre to be saved in taxes by curtailing expenditures further or avoiding needed additional construction.

Delivery of Water

The water-delivery force consists of three superintendents reporting directly to the manager, and 31 ditch riders and gate tenders.

Water is delivered on demand throughout the irrigation season so long as the supply permits. The maximum efficient carrying capacity of the canal for the District's needs (aside from Northport carriage) is an aggregate of 400 delivery heads or streams of 2 second-feet each, one such head being used on an 80-acre tract. This has usually been about the maximum demand. When the water supply falls below the amount needed to fill the demands, a system of rotation is put into effect, with three-day intervals on and off rotation. It has been necessary to rotate each season for the past several years. In 1932 rotation was begun July 1.

Delivery is made to each individual user at his land or within a short distance of it.

The District's water record shows 318,122.4 acre-feet diverted from North Platte River and from six drains in 1932, of which 269,674 acre-feet, or 85 per cent, was from the river. Of the total quantity diverted, 77,571 acre-feet was for Northport Irrigation District and 240,551.4 for Farmers' District.

Waste and loss of Farmers' water aggregated 76,578 acre-feet. Thus the net quantity delivered to users in the District was 163,973.4 acre-feet.

Diversions and deliveries per acre in 1932, of Farmers' Irrigation District water, averaged as follows:

	Acre-feet per acre
Gross diversion, 67,667.8 acres	3.55
Net delivery, 67,667.8 acres	2.42
Net delivery, 50,151 acres irrigated	3.27

(47,151 acres which drew water by complying with requirements as to O. & M. payments, plus 3,000 acres of preferred rights)

Drainage

The cooperative drains have been discussed in some detail ("Contractual Relations etc. - Cooperative Drainage Contracts"). According to a statement prepared by the District, its share of the operation and maintenance costs of cooperative drains used by the United States, for the years 1919 to 1930, inclusive, was approximately $117,000. The District has also done some drainage work solely on its own account.

In 1932 there were 9,478.4 acres of land in the District valued for assessment purposes at $1 per acre. Much of this is water-logged land that was once cultivable and carried in the higher valuation brackets. The nominal assessment is made to hold the land in the district pending possible eventual reclamation.

DISTRICT FINANCES

Bonds

The $2,000,000 bond issue of January 1, 1926, is outstanding in full. The principal maturities begin in 1935. These bonds bear interest at the rate of 6 per cent per annum, payable semi-annually January 1 and July 1.

Bonds of the original issue of 1913, bearing 6 per cent interest, were outstanding December 31, 1932, in amount of $18,900. They consisted of a $500 bond due in 1924 and never presented for payment, $11,700 due in 1932 and not paid, and $6,700 due in 1933. Of the bonds maturing in 1932, $2,000 were paid.

Red Willow drainage bonds in amount of $15,500 and bearing 5 per cent interest are outstanding, payable in 1938.

Appendix B contains a list of maturities of all bonds beginning with the year 1932, together with interest due annually.

Bond Interest

Bond interest paid during 1932 is shown by the District audit as follows:

On Special Bonds	$81,458.58
On Original Bonds	266.09
On Red Willow Bonds	775.00

The following statement appears in the audit:

"I did not attempt an accurate check of the interest due and payable as of December 31, 1932 on the bonded indebtedness of the District. The amount of interest paid during the year deducted from the amount that became due and payable during the year, plus the amount that came due January 1, 1933 gives a delinquent amount of approximately $85,729.07.

"The interest on Red Willow Bonds has been paid regularly when due. The Treasurer of Morrill County makes this payment direct out of the funds collected."

Status of Bond Funds

Special Bond Fund. - The major bonded indebtedness of the district is accounted for in this fund. According to the District audit, there was a balance of $39,050.90 in this fund January 1, 1932, and $3,393.84 December 31, 1932.

Collections during the year, exclusive of interest on delinquent taxes, totaled $45,155.06. The audit shows $3,820.47 collected as interest on delinquent District taxes, but does not show how the amount is distributed among the several funds.

Delinquent taxes in the Special Bond Fund levies for the years ending with 1931 aggregated approximately $219,875 as of December 31, 1932. For 1930 they exceeded one-fourth of the levy, and for 1931 were about two-thirds. Default in payment of bond interest necessarily ensued.

Bond Fund. - This fund accounts for the remaining original bonds of the District. The audit shows a balance of $531.39 on January 1, 1932, and $916.53 on December 31 following. Collections during the year, exclusive of interest on delinquent taxes, totaled $3,403.93.

The Bond Fund levies for years 1927 to 1931, inclusive, showed accumulated delinquencies of about $10,532 on December 31, 1932.

Contract Obligations

Indebtedness to the United States on account of Pathfinder Reservoir and drainage construction is all represented by the contract of July 15, 1927. Repayments are shown in Appendix B.

Payments for 1931 and half of 1932, deferred under the first Congressional moratorium, were ordered paid in two installments in 1943 and 1944. At the time this investigation was made, repayment of the District's installments deferred under the second moratorium and adjustment of interest had not been ordered. In the absence of specific information, the tabulation in Appendix B shows the three deferred installments with accrued interest payable in 1943, 1944, and 1945 - which may or may not be the arrangement in which they are actually to be ordered repaid.

The District has no other contract indebtedness.

United States Contract Fund. - This fund was set up in accordance with a provision in the contract of July 15, 1927. The District audit shows a balance in the fund of $1,238.17 on January 1, 1932, and $1,485.71 on December 31 following.

Collections during 1932, exclusive of interest on delinquent taxes, totaled $9,851.12. Disbursements from the fund consisted of $9,800.00 remitted to the District Treasurer.

Accumulated delinquencies in the levies for this fund for the years 1926 to 1931, inclusive, totaled $36,268.48 as of December 31, 1932.

On account of the moratorium, no levy was made for 1932.

Warrants

The 1932 audit contains the following statement concerning warrants:

Warrants outstanding, January 1, 1932		$73,942.80
Warrants issued during 1932:		
1931 levy	$44,284.84	
1932 levy	8,215.38	52,500.22
		$126,443.02
Warrants paid during 1932:		
By District Treasurer	42,902.80	
By County Treasurers of Morrill and Scotts Bluff Counties, to apply on payments of taxes	3,228.04	46,130.84
Warrants outstanding, December 31, 1932		$ 80,312.18

The proceeds of warrants, amounting to $50,833.60, were credited to the Operation and Maintenance Account.

General Fund

The audit shows a balance in this fund of $2,888.33 on January 1, 1932, and $3,611.97 on December 31, 1932. Collections during the year aggregated $39,136.17, exclusive of interest on delinquent taxes. The principal disbursement was $38,450 remitted to the District Treasurer.

Accumulated delinquencies in the General Fund levies for years ending with 1931 amounted to about $244,400 on December 31, 1932.

Assessments and Tolls

Valuations. - Assessments for irrigation district purposes are levied upon an ad valorem basis, the value of land being taken exclusive of improvements. Farmers' District has adopted a scale of valuations under which the lands were classified for the 1932 levy as follows:

TABLE 1. Classification of lands for District assessment purposes.

Scale of value	Total acreage	Total valuation	Per cent of total acreage	Per cent of total valuation
$50	33,396.0	$1,669,800.00	53.46	69.47
45	6,012.2	270,549.00	9.62	11.27
40	6,582.8	263,312.00	10.54	10.97
35	1,580.1	55,303.50	2.53	2.31
30	2,182.9	65,487.00	3.49	2.73
25	885.8	22,145.00	1.42	.93
20	1,837.1	36,742.00	2.94	1.53
10	286.1	2,861.00	.46	.12
1	9,478.4	9,478.40	15.17	.32
Lots	232.2	8,291.00	.37	.35
Total	62,473.6	$2,403,968.90	100.00	100.00

It will be noted that lands of the highest class include more than half of the assessed area and more than two-thirds of the assessed valuation, which means of course that they are charged with more than two-thirds of the District taxes.

Lands of the three highest classes embrace about 74 per cent of the acreage and 92 per cent of the valuation.

Scotts Bluff County includes 35,628.4 acres and Morrill County 26,845.2 acres of assessed District lands. The distribution among the several classes is quite different in the two counties, for two-thirds of the Scotts Bluff lands and only one-third of the Morrill lands are in the $50 class. The average valuation per acre is $41 in Scotts Bluff County and $34 in Morrill County. Lands of the three highest classes include 97 per cent of the total valuation in Scotts Bluff County and 84 per cent in Morrill County. Percentages of land in the several classes are as follows:

Scale	Scotts Bluff County	Morrill County
$50	68.81	33.09
45	8.01	11.76
40	5.36	17.42
35	.53	5.19
30	1.60	6.01
25	.48	2.66
20	1.76	4.51
10	.10	.94
1	12.82	18.25
Lots	.53	.17
	100.00	100.00

The relatively larger areas in all the lower brackets in Morrill County are evident from the above table. Even so, in driving over the eastern portions of the District, the authors were impressed by the extent of poor land there included in brackets higher than appears justified under present conditions. It was felt for example, that many farms in the $40 class under the lower end of the canal are not on a par with $40 land in Scotts Bluff County.

Levies. - Annual levies are shown in Table 2.

TABLE 2. Levies for District purposes, mills.

Year	General Fund	Special Bond Fund	Bond Fund	U. S. Contract Fund	Total
1913	23	70			93
1914	20	70			90
1915	40	50			90
1916	40	55			95
1917	70	35			105
1918	80	20			100
1919	95	25			120
1920	110	40			150
1921	100	30			130
1922	60	40			100
1923	60	40			100
1924	55	45			100
1925	50	50			100
1926	45	50		15	110
1927	45	50	3	12	110
1928	45	50	3	12	110
1929	45	60	3	12	120
1930	45	50	3	12	110
1931	45	50	4	11	110
1932	20	50	3	-	73

It will be noted that the General Fund levy for 1932, which is payable December 1 of the year in which levied and is delinquent on May 1 following (i.e., 1933), is less than half the previous year's levy. This, however, is to be supplemented by a system of toll charges discussed below.

The amounts which the levies were intended to yield are shown in Appendix C.

Tolls. - Delinquencies in payment of the 1931 levy indicated a serious shortage of funds for operation and maintenance in 1932. To secure available funds, the board adopted the policy of refusing to deliver water to lands delinquent in payment of more than two years' taxes (C.S. 1929, 46-109) and for which a warrant equal in amount to the 1931 General Fund levy against such tract had not been purchased

as of the date of water delivery in 1932. As shown above, the sale of warrants in 1932 against the 1931 and 1932 levies yielded around $50,000. Lands that failed to receive water in 1932 by reason of these conditions appear on one of the accompanying maps.

For the 1933 season it was decided to supplement the General Fund levy with a system of toll charges for water (C.S. 1929, 46-127). The levy was accordingly reduced to yield about $48,000, instead of the $108,000 to $110,000 levied in the six preceding years; and the board of directors by resolution fixed a toll of $1.25 per acre for water, payable by March 1 and drawing 7 per cent interest thereafter, and in any event payable in advance of water delivery.

The amount of tolls collected to April 14, 1933, was $23,144.04.

Delinquencies

Outstanding taxes for years in which levied are shown in detail in Appendix C. The situation is summarized in Table 3.

TABLE 3. Summary of outstanding taxes in several Funds, December 31, 1932.

Fund	Delinquencies 1913-1931, incl.	Unpaid 1932	Total outstanding all levies
General Fund	$244,400.77	$ 47,683.18	$292,083.95
Special Bond Fund	219,874.88	119,207.92	339,082.80
Bond Fund	10,532.09	7,152.50	17,684.59
U. S. Contract Fund	36,268.48	-	36,268.48
Total	$511,076.22	$174,043.60	$685,119.82

Delinquencies in levies for years prior to 1929 in no case exceeded 8 per cent as of December 31, 1932. The 1929 delinquency, however, was 13.7 per cent; 1930, 28.5 per cent; and 1931, 67 per cent. Less than 1 per cent of the 1932 levy had then been paid, but it does not become delinquent until May 1, 1933, and is therefore classed as "outstanding" rather than "delinquent."

Taxes collected, exclusive of refunds and scavenger tax sales, ranged from 83 to 96 per cent of the levies for the years ending with 1929, being 85 per cent for the year 1929. The proportion for 1930 was 70 per cent, and for 1931, 32 per cent. The scavenger tax sales covered the levies to 1927, inclusive.

Tax certificates held by District. - In September, 1931, the District took tax certificates on approximately 5,587 acres in Morrill County. The total amount of the certificates was $363,589.95. Interest and advertising came to $162,402 and taxes of other districts $6,305.33. The principal amount of Farmers' District taxes involved was thus $207,493.28. The delinquencies in some cases went back to 1913 and in at least one instance to 1907.

STATE, COUNTY AND SCHOOL TAXES

Taxes for 1931

The 1931 general tax (State, County, road, and school purposes) on lands in Farmers' Irrigation District, according to a statement prepared in the District office, was as follows:

TABLE 4. General taxes for 1931 on Farmers' District lands.

	Acreage	Valuation	Total tax	Average tax per acre
Agricultural land:				
Scotts Bluff County	34,976.4	$2,101,255	$56,589.31	$1.62
Morrill County	25,614.3	1,364,570	24,698.21	.96
Total	60,590.7	$3,465,825	$81,287.52	$1.34
Town lots, railroad right of ways, and small tracts	1,922.2	45,000	2,025.00	1.05
Total for district	62,512.9	$3,510,825	$83,312.52	$1.33

Comparison with 1929 county-wide taxes. - The 1930 Farm Census gives the following summary of farm taxes for 1929, as reported by full-owners, on land and buildings only:

	The State	Scotts Bluff County	Morrill County
Average tax per acre	$1.07	$1.12	$0.16
Ratio of taxes to value, per cent ...	0.61	1.92	1.09

The great difference between the counties in proportion of land under irrigation accounts largely for the difference in average county-wide taxes. The 1930 Census of Irrigation shows that 51.2 per cent of the total area in farms in Scotts Bluff County is irrigated, and 11.5 per cent of the total farm area of Morrill County.

Present Valuations

Valuations for 1932 were substantially reduced. No attempt was made to compile the total 1932 valuation, but the tax rolls were examined in order to ascertain the usual valuations of irrigated lands in the District for State and County purposes. These valuations so noted are for land alone.

In Scotts Bluff County 169 tracts totaling 11,938 acres were taken at random. The valuations of these tracts ranged from $10 to $65 per acre, with a weighted average of $48 per acre. The proportion of higher values in the two easternmost precincts (Tabor and Highland) was greater than at the upper end of the canal, and appeared to be greatest in Winter Creek Precinct, which includes the City of Scottsbluff.

In Morrill County an examination of 44 tracts including 1,788 acres showed a range of $4 to $71 per acre. The average was $28 per acre; but due to the smaller number of tracts examined, this average is much less reliable than that for Scotts Bluff County.

The weighted average for all 213 tracts was $45 per acre.

The results indicate that the poorest irrigated lands are being valued generally at $4 to $8 or $10 per acre; a large proportion of tracts at $35 to $55; and apparently very few at $65 or higher. Probably $55 would be representative of the better grades of irrigated land within the district, exclusive of the value of improvements.

Rates of Levy

The rates of levy upon lands in Farmers' Irrigation District for purposes of general taxation, during the period 1922-1932, are summarized in Table 5.

TABLE 5. General tax levies upon lands in Farmers' Irrigation District, mills.

Year	Scotts Bluff County				Morrill County			
	State and County	School and precinct		City of Morrill	State and County	School and precinct		City of Bayard
		Maximum	Minimum			Maximum	Minimum	
1922	5.9	25.5	6.5	16.4	6.23	28.0	7.0	17.6
1923	6.7	26.5	5.7	17.6	5.5	28.0	7.8	17.2
1924	6.2	22.5	4.0	15.4	6.0	29.0	7.7	22.2
1925	5.95	29.7	7.0	15.6	5.85	23.5	5.0	18.7
1926	6.5	25.8	4.5	15.7	5.0	21.0	2.5	21.6
1927	9.25	25.1	2.0	18.0	7.2	20.0	4.3	17.0
1928	7.8	30.2	2.3	18.0	5.6	20.0	3.3	22.6
1929	8.6	25.7	3.3	20.0	5.9	20.0	4.3	17.3
1930	9.0	26.9	4.5	23.8	6.4	19.5	3.5	24.2
1931	9.3	28.0	5.1	19.6	6.3	20.0	7.0	24.3
1932	10.3	28.0	6.3	19.3	7.1	23.5	7.0	19.2

The maximum and minimum levies for strictly agricultural lands are the figures shown in the "State and County" column plus those in the appropriate "School and precinct" column.

Only 186.6 acres of assessed district lands are included in the City of Morrill and 45.6 acres in the City of Bayard. In most years these lands were taxed at the maximum or close to the maximum rate for country lands in addition to the city rate.

Land valued at $65 per acre (exclusive of improvements), under the maximum 1932 levy, would pay $2.49 per acre in Scotts Bluff County and $1.99 in Morrill County; under the minimum 1932 levy, $1.08 in Scotts Bluff and $0.92 in Morrill.[1/]

Corresponding figures for $55 land would be $2.11, $1.68, $0.91, and $0.78.

Delinquencies

The records of the County Treasurers of Scotts Bluff and Morrill Counties were examined in order to ascertain the delinquencies in payment of general taxes assessed against lands in Farmers' Irrigation District. To arrive at the correct result it was necessary to reconcile these records with the statement of tax certificates taken by the District in 1931 on Morrill County lands. The delinquencies for the years ending with 1931 are:

Scotts Bluff County	$50,010.38
Morrill County	46,569.23
Total	$96,579.61

The 1932 tax becomes delinquent May 1, 1933. The amount of the 1932 tax was not determined.

Total delinquencies against District lands, for both District and State and County taxes, for the years ending with 1931, are thus:

Scotts Bluff County	$230,134.13
Morrill County	377,521.70
Total	$607,655.83

BONDED INDEBTEDNESS OTHER THAN FARMERS' DISTRICT BONDS

Lands in Farmers' District, in common with other lands in Scotts Bluff and Morrill Counties, are subject to $2,065,630 of public bonds other than those of the District. Of this total, $1,564,630 are against lands in Scotts Bluff County and $501,000 against lands in Morrill County, and have been issued for the following purposes:

[1/] Taxes for all purposes (including irrigation) on Mr. Fred D. Beltner's group of farms, discussed later in this report, averaged $6.74 per acre for 1920-1929, incl.

Scotts Bluff County

County. - Outstanding county bonds total $404,000, for bridges, roads, court house and jail, and refunding purposes. These are 5 per cent bonds, with the exception of the refunding issue bearing 5½ per cent interest.

School districts. - Of the 20 school districts involved, 12 have bonds outstanding in a total amount of $1,067,385. Interest rates range from 4½ to 6 per cent, the largest issues carrying the 4½ and 4-3/4 per cent rates. Scotts Bluff City School District alone has $683,000 of this bonded indebtedness.

Precincts. - Highland Road Precinct has a $3,000 issue and Tabor Road Precinct a $6,000 issue outstanding, both bearing 6 per cent.

City of Morrill. - The City has $84,245.15 of bonds outstanding. They are for water, lighting, sewer, and refunding purposes, and bear interest rates ranging from 4½ to 6 per cent.

Morrill County

County. - $38,000 of bridge bonds bearing 5 per cent interest.

School districts. - Four of the eight school districts have $322,000 of bonded debt. One of the districts - No. 21 - has $301,500 of this total, bearing 5 to 6 per cent interest. The other school district issues bear 6 per cent.

City of Bayard. - The City has $141,000 of 4-3/4 to 6 per cent bonds for water, paving and refunding purposes.

INDIVIDUAL INDEBTEDNESS

Real Estate Mortgages

A statement of mortgages against lands in Farmers' District, prepared in the District office in the fall of 1932, may be summarized as follows:

TABLE 6. Summary of mortgages

Mortgagees	First mortgages		Second mortgages		Third mortgages	
	Area	Amount	Area	Amount	Area	Amount
Federal Land Bank	3,794.8	$ 201,100.00	76.6	$ 2,000.00		
Other Organizations	11,218.2	565,854.07	453.4	20,000.00		
Individuals	8,064.0	498,650.96	900.1	31,810.66	280.4	$5,500.00
Totals	23,077.0	$1,265,605.03	1,430.1	$53,810.66	280.4	$5,500.00

In addition to the above, the statement shows an estimated total of $95,000 against town lots, railroad right of ways, and small tracts.

Blanket mortgages aggregate $346,137.44. Much of this amount lies against lands both within and without the District boundaries.

The acreage of land mortgaged is 37 per cent of the total District assessed area.

The land mortgaged falls into the following District assessment classes. Where the statement shows the value per acre to be some figure intermediate between two classes (such as $48), as occurs in some cases, the tract is being placed for the purpose of this summary in the nearest assessment class.

TABLE 7. Areas of land under mortgage, segregated by assessment classes

Assessment class	First mortgages		Second mortgages	Third mortgages
	Acres	Per cent	Acres	Acres
$50	15,255.8	66.1	928.4	280.4
45	3,596.3	15.6	310.1	-
40	1,295.5	5.6	40.0	-
35	944.1	4.1	-	-
30	866.9	3.7	151.6	-
25	360.9	1.6	-	-
20	616.3	2.7	-	-
1	141.2	.6	-	-
Totals	23,077.0	100.0	1,430.1	280.4

Of the 141.2 acres in the $1 class, 122.3 acres are under blanket mortgages.

Interest. - Interest rates reported on the first mortgages are as follows, the amounts of principal being shown to the nearest dollar:

Amount	Interest, per cent
$ 35,477	10
14,441	9
3,500	8½
70,123	8
3,000	7½
125,130	7
38,400	6½
486,999	6
119,600	5½
17,800	5¼
226,500	5

The above amounts represent 90 per cent of the first mortgages, interest rates on the others not being reported. Of the above amounts, $850,899, or 75 per cent of the total, bear interest at 6 per cent or lower, while a weighted average of the entire amount is 6.16 per cent.

Maturities. - Maturities reported for the first mortgages are as follows, the amounts of principal being shown to the nearest dollar:

1923	$15,000	1957	$30,100
1924	32,319	1958	21,500
1925	-	1959	40,300
1926	15,500	1960	16,900
1927	17,600	1961	6,500
1928	10,000	1962	-
1929	21,450	1963	3,000
1930	53,646	1964	-
1931	40,779	1965	6,600
1932	89,369		
1933	220,286		
1934	122,239		
1935	123,300		
1936	79,824		
1937	23,058		
1938	24,250		

The above maturities account for 80 per cent of the first mortgages. It will be noted that $295,663 of the amounts shown matured in the years ending with 1932 and therefore are overdue; that by far the heaviest group of maturities is in the present year 1933; and that the amounts maturing in the four years beginning with 1933 aggregate $545,649.

Census returns. - The 1930 Farm Census reports the charges on mortgage debt (interest, etc.) for 1929 as reported by full-owners owning no other farm land. The County averages of course include both land inside and outside of Farmers' District. The results are:

	The State	Scotts Bluff County	Morrill County
Ratio of debt to value, per cent	39.42	32.53	38.22
Ratio of charges to debt, per cent	5.66	6.73	6.50

Credit

While several bank failures occurring during the present economic depression have affected the fortunes of many of the farmers, these have at no time left the residents of the District without banking facilities, and the District itself has lost no funds by reason of them. The general banking holiday was in progress at the start of the survey now being reported, but at its termination the previously operating banks were reopened, apparently on an undisturbed basis.

Loans on real estate are, however, inactive, and have been so for some time, especially since the fiscal affairs of the District became threatening. The foregoing summary of the farm mortgage situation indicates an average annual rate on existing real estate loans of slightly more than 6 per cent, the majority of the loans ranging from 5 to 6 per cent. Local bankers who were interviewed cited a normal range of 6 to 7 per cent for the community.

Chattel loans constitute a heavy percentage of the loans made by the local banks; and most of these represent advances made on cattle and sheep brought from the range to the Valley for winter feeding and spring marketing. Eight per cent is the usual annual rate on such loans, which run from four to six months only.

Loans made on crops are usually at the rate of 10 per cent per annum. Settlement of these, when sugar beets are grown, is ordinarily made from the checks drawn by the Sugar Company in favor of the farmers. The division of the amounts of the checks often involves, besides the bank and the farmer, the landlord, the boss of the beet labor crew, and other creditors of the farmer, the bank thus operating as a sort of general fiscal agent for all interests.

FARM OWNERSHIP AND OPERATION

The type of lease in practically universal use provides for a division of the crops between tenant and owner. The owner pays the taxes, including all irrigation assessments and tolls, agreeing (in a typical lease) to furnish the water but not to be responsible for any damage resulting from the water service, shortage of water, or overflow. Division of the crops is in ratios which vary only slightly. Until recently the division of the sugar beet crop usually gave one-fifth of the beets to the owner. This proportion has quite generally been advanced to one-fourth in the case of the better farms and those located closest to beet dumps. For instance, one corporation leasing out several farms takes one-fourth of the beets and gives the tenant all the beet tops, provided they are fed in a closed lot on the farm -- this is in case the haul to the dump is one mile or less. If the haul is more than one mile the tenant keeps the tops, with the same proviso, and pays the owner one-fifth of the beets. Another landlord's lease provides that if the owner's share is one-fourth the tenant takes all the tops, provided they are fed to stock on the farm; if the beet division is on the one-fifth basis, the tops are divided equally between owner and tenant. Still another lease specifying a one-fourth basis for the beet division provides for an equal division of the tops, or varies the division if both owner and tenant are involved in the feeding industry.

Practically all leases provide that the tenant shall buy the beet seed.

The division of other crops than beets, stated in the fraction paid the landlord, is more or less uniformly on the following plan:

Alfalfa and sweet clover, loose hay in the stack, half-half. The landlord buys the seed.

Small grains and corn, one-third. Corn is planted principally on sandy land where blowing may be a hazard to other crops.

Potatoes, one-third or one-fourth, where each party furnishes his own sacks, the tenant buying the seed; or one-half if the owner buys the seed.

As is stated in greater detail in another part of this report, the use of the tops in stock-feeding operations has the principal purpose of assisting in the fertilization of the soil. If they can not be utilized in this way on the farm where they are produced they are sold elsewhere. If the beet production is 12 tons an acre, the tops bring about 15 to 20 cents per beet ton. The usual return before the present era of low prices was 25 to 30 cents per beet ton.

Only 22 per cent of the farms in the District are operated by their owners and the irrigated acreage in these farms is only 20 per cent of the total irrigated acreage. The agriculture of the District is therefore characterized by an unusually heavy proportion of tenantry, many of the farms, in fact, being owned by individuals or corporations resident outside the Valley. Some, locally owned, are the property of persons who have operated them in the past but more recently have rented them, preferring to supplement the rents with such income as they may receive from other pursuits than farming. Others are held by business or professional men or institutions who have acquired them as investments or in the settlement of debts.

The statistics illustrating the facts as to ownership are set out in Table 8.

TABLE 8. Farmers' Irrigation District.
Owner-occupied and owner-operated farms.

All Tracts [1]	Number		Area	
		Per cent	Acres	Per cent
Total	763	100	60,590.7	100
Occupied by owner	176	23	12,848.8	21
Operated by owner	171	22	11,935.7	20
Tracts Containing Irrigated Acreage			Area irrigated	
			Acres	Per cent
Total	739	100	53,224.6	100
Occupied by owner	171	23	11,749.5	22
Operated by owner	166	22	10,843.5	20

[1] Exclusive of "Town Lots, Railroad Right of Ways and Small Tracts (Estimated)" 1,922.2 Acres

	Acres
Farms	60,590.7
Total	62,512.9

The proportion of tenants, while exceptionally high, is otherwise merely typical of circumstances appurtenant to the raising of sugar beets in the irrigated areas east of the Rocky Mountains. Most of the farms are rented to Russians, Mexicans, or Japanese, who are good beet farmers but do not take kindly to other crops. If allowed to follow their own inclinations, "the better class of these beet farmers make money because they rent farms on which there is a large acreage of alfalfa ready to be broken out. They crop this alfalfa land to beets three or four years and then move to another farm with a large acreage of alfalfa -----. The second farmer usually grows two crops of beets and then moves on, making room for a third and still poorer beet farmer." 1/

While the inclination of many tenants is still to concentrate too strongly on the growing of beets and to change farms upon the depletion of the soil's fertility, the practice just described has been modified somewhat since Mr. Holden's circular was written, by means of crop rotations enforced by the Sugar Company through the medium of its seasonal contracts with the growers, by virtue of a better education of the landowners in the dangers of too heavy and continuous a concentration on one crop, and by the exigencies of recent hard times, which have led tenants into a measurable appreciation of the advantages of lease renewals where good farms are involved, and of the mutuality of interest of themselves and their landlords. Hence, while most leases continue to be written for single years only, the turnover of tenants is asserted to be somewhat lower than it was a few years ago.

It is a fact generally, although not universally characteristic of farming throughout the United States, that the average tenant farm is a better farm (at least when measured by its valuation) than the average owner-operated farm. Statistics from the 1930 Federal Census for Scotts Bluff and Morrill Counties bring out this fact, and since more than one-third of the irrigated farms in the two counties are in Farmers' Irrigation District, the figures are doubtless generally applicable to the present discussion. They appear in Table 9.

1/ U. S. Department of Agriculture, Department Circular 289, "The Work of the Scottsbluff Experiment Farm in 1920 and 1921," James A. Holden, Farm Superintendent.

TABLE 9. Average sizes and values of irrigated farms[1] and their equipment, Scotts Bluff and Morrill Counties, 1930.

	The State	Scotts Bluff	Morrill
	Acres	Acres	Acres
Average area, per irrigated farm	358.2	175.7	359.0
Owner-operator farms	474.7	205.1	487.3
Tenant farms	244.1	152.0	273.4
	Dollars	Dollars	Dollars
Average value, land and buildings			
Per irrigated farm	18,491.00	13,575.00	11,473.00
Per acre, per irrigated farm	51.63	77.25	31.96
Per acre, per owner-manager irrigated farm	43.45	67.78	24.72
Per acre, per tenant irrigated farm	67.00	87.58	40.57
Average value of implements and machinery			
Per irrigated farm	1,451.00	1,472.00	1,070.00
Per acre, per irrigated farm	4.05	8.37	2.98
Average value of buildings (including dwellings)			
Per irrigated farm	3,164.00	2,614.00	2,053.00
Per acre, per irrigated farm	8.84	14.87	5.75

1/ "Irrigated farms", as defined by the Bureau of the Census, are those reporting the irrigation of any land whatsoever in the census year.

The average sizes of farms shown in Table 9 are larger than the average reported by the District, which is less than 100 acres, principally for the reason that the census classification of "irrigated" farms included many large ranches of which only relatively small portions were irrigated. On the other hand, the average values shown appear to represent 1930 values for the District fairly well.

While most of the ownerships comprise single farms, several large corporations are operating separate tracts comprising several thousand acres under a tenant system, but with central management. The District itself has taken title to only 360 acres under tax foreclosure, and of this acreage it now holds only 200 acres. Title to approximately 4020 acres is held by the State of Nebraska, this acreage being school lands sold under contracts which have not been discharged. No lands are held by the United States.

For many years the agriculture of the District has been founded upon the sugar beet, which is, in fact, the major irrigated crop of the upper North Platte Valley in Nebraska. Thus the 1930 Census showed that beets constituted more than one-fourth of the acreage of 1929 irrigated crops harvested[1], in Morrill County, and nearly one-third of the corresponding acreage in Scotts Bluff County. The District itself does not conduct an annual crop survey, but its 1932 estimates showed 33 per cent of its cropped area in beets, 18 per cent in alfalfa, 18 per cent barley, 16 per cent corn, six per cent potatoes, five per cent oats, and smaller proportions in other small grains, beans, and gardens. This estimate is substantiated by the accurate records of the Great Western Sugar Company, which showed for 1932 a sugar beet area of 14,005 acres, or approximately 30 per cent of the 47,151 acres within its own boundaries to which the District delivered water that year. The latter area included several hundred acres of pasture and other lands from which no crops were harvested. In a number of seasons prior to 1932 the beet acreage was even larger, as is shown by the following statement of acreage and yields for the five year period ending with 1932:

Year	Area Acres	Yield Tons	Average yield per acre Tons
1928	20,277.82	242,512.00	11.97
1929	19,731.63	211,394.00	10.71
1930	16,350.13	227,035.00	13.89
1931	13,171.59	185,113.00	14.05
1932	14,005.45	184,293.00	13.16
Average for the period	16,707.30	210,069.00	12.57

The 30 per cent decline in acreage between 1928 and 1932 by no means forecasts a further reduction. When the survey now being reported was in progress, beet-planting contracts for 1933 were just being written, and no estimate of probable area was available. The then-threatened water shortage may have curtailed the acreage for the 1933 season; but the beet industry is well established, and the 1931-32 acreages are about what the agriculturists of the Great Western Sugar Company, as well as other authorities, consider proper in the favored plans of crop rotation. The effort in general is to keep the beet area at less than one-third of the total cropped area, principally in order to maintain proper soil fertility and control the depredations of the sugar beet nematode.

The apparent results of the Sugar Company's effort to keep the area in beets at no more than one-third the cropped area, applied to the Farmers' District, will be set out at another place in this discussion. The policy

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1/ "Irrigated crops harvested" did not include pasture, land from which the crops were not harvested because of failure, areas in rights of way, feed lots, etc.

is supported in general by the local representatives of the United States Department of Agriculture and the State Agricultural Experiment Station, but the company makes no actual refusal of contracts in specific instances where plantings in excess of this proportion are proposed, allowing extraordinary conditions to amend the usual restriction. The effect of this policy in the sections of the Valley tributary to the factories at Scottsbluff, Gering, Bayard, Minatare, Mitchell and Lyman, (including the Farmers' District), as reflected by the yearly proportions which the acreage planted to beets is of the total irrigable area of the farms involved, has been as follows (see Appendix D): 1929, 38.35 per cent; 1930, 33.62 per cent; 1931, 29.3 per cent; 1932, 29.8 per cent. It is apparent that a strict adherence to the policy will permit no large increase in the sugar beet area, either in the Valley at large or in Farmers' District.

The relative position in the Valley's agriculture, of other crops than beets, is shown, crop by crop, in Appendix E. In the case of none of these is there disclosed any wide fluctuation from year to year. The annual distribution of crop areas on farms growing sugar beets apparently is fairly well established on a basis approximately as follows: Beets, 30 per cent; alfalfa and alfalfa and grain (other than corn), 28 per cent; clover and clover and grain (other than corn), eight per cent; corn, 10 per cent; other grains, eight per cent; potatoes, eight per cent; other crops, nine per cent.

Crop Rotation

A rotation of crops means the growing of two or more crops in a more or less fixed cropping scheme in which each crop follows another in a somewhat definite order so that the rotation requires as many years as there are crops to complete the cycle. The Agricultural Experiment Station near Mitchell, which is supported by the United States Department of Agriculture and the State University, has experimented with at least 35 irrigation cropping systems. The Station considers the following to be the essentials of a good rotation system: (1) There should be as many fields of somewhat equal size as there are crops in the rotation, so that there will be the same acreage of each crop every year; (2) every rotation should include either alfalfa or sweet clover and the applying of barnyard manure to keep up or increase the productiveness of the land; (3) no rotation is complete without a cultivated crop such as potatoes, corn, or sugar beets; (4) small grain should be included in the rotation, but should be used only when alfalfa or sweet clover is seeded with it. Barley is perhaps the best small grain crop to grow. The Station cites the following as being some advantages of a rotation system: (1) Larger yields per acre with greater profit; (2) better distribution of labor which will result in less hired help; (3) a more economical use of irrigation water; (4) less trouble from diseases and pests; (5) minimum of risk from hail, low market prices, and other factors which might prove disastrous to one crop but seldom to all; (6) facilitation of the keeping of live stock, such as poultry, hogs, and dairy cows, which should be on every farm.

For instance, the Station favors one plan for an 80-acre farm on which two rotations are used, one running four years on about one-fifth of the farm and one seven years on the remainder. The four-year rotation

includes three acres of sweet clover (besides two plots of beets) which will furnish summer pasture for a small herd of dairy cows. The seven-year rotation produces the bulk of the money crops (including sugar beets), alfalfa hay, and barley, and supplies alfalfa pasture for hogs. Based on results secured at the Station over more than a dozen years, such a cropping system should produce enough forage (excepting grain) for four work horses, 10 head of dairy stock, two carloads of hogs, and to fatten two carloads of lambs. Besides this, there should be 2800 bushels of potatoes, 720 bushels of barley, and 455 tons of beets.

Efforts to control the depredations of the sugar beet nematode, a pest of microscopic size which feeds on the sap of the beet and eventually kills it, have had much to do in recent seasons in shaping crop rotations on the beet farms.[1/] The Sugar Company will enter into no contracts involving fields where the nematode has been discovered until the expiration of at least four years after the discovery, that time usually being enough to effect the starvation of the pest. However, after the four years' interval, only a one year's planting is agreed to for each previously infested plot, this to be followed by another crop before beets are grown again. On the other hand, no non-infested tract is kept in beets for more than four years without the intervention of some other crop, if the company's usual advice is followed.

Areas not suited to the growing of beets are localized, except in relatively broad sections of the extreme eastern portion of the District where the soils are sandy and, whether fertile enough or not, "blow" so readily during the early summer wind storms as to give the young beet plants small chance to survive, either because of being buried or cut off by the sand. In these cases potatoes, corn, or alfalfa may survive; potatoes, in fact have been grown independently of the beet rotation (as well as in it) throughout the Valley for many years, although not recently filling a prominent place in the District's agriculture largely because of low prices and necessity to transport the crop to distant markets.

The Feeding Industry

This necessity does not apply to the other crops, principally because of the extensive feeding industry which is considered to be in several respects, an essential adjunct of beet farming. The tops of the beet plant, cut from them in the field when the beets are harvested, make a winter feed much relished by cattle and sheep, while the pulp residue of the beets themselves, after the extraction of their sugar, is likewise a nourishing feed which the factory markets either fresh or dried. Combined with the alfalfa or clover and the corn and small grains which enter into the crop rotation, these beet by-products normally form the basis of a

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1/ In the territory tributary to the Company's factories in Colorado, Nebraska, Wyoming, and Montana, the following has been the record of nematode infestations: 1917, 4 farms; 1921, 138 farms; 1927, 745 farms; 1932, 1733 farms. In the last five years the company first detected infestations on 711 farms; in 1932 alone, on 255 farms.

well-balanced feeding industry, which fits into the agricultural program after the harvest of the beets and terminates before the planting of another crop. Exact figures as to the number of cattle and lambs fed in the District could not be obtained, but the following estimates will serve to indicate closely enough, the extent and importance of the industry:

Lambs fed in North Platte Valley (Guernsey, Wyo., to Bridgeport, Nebr.)

1928-1929	485,000
1929-1930	390,000
1930-1931	415,000
1931-1932	410,000
1932-1933	435,000

The number of cattle fed has run from about 30,000 to 40,000 up to this year, the current number being about 20,000 to 25,000. The feeding of lambs is thus holding its own, despite low prices, while cattle feeding has fallen off somewhat because of heavy losses suffered by feeders in recent seasons. Hogs also are fed, but not in equally important numbers on most farms. Poultry and bees make welcome additions to the farmer's cash income, but not a heavy contribution to the District's commerce. Most farmers keep vegetable gardens, which help materially in providing the necessities of the family living.

While some relatively large-scale feeding is done on a speculative basis by interests not themselves engaging in the growing of beets, most of the feeders are beet farmers or their landlords, neither of whom, while they hope by feeding to translate their beet tops, hay, and grain into tangible profits, are so much interested in that prospect as in the provision of essential fertilizer for the beet fields, as represented by manure from the feed lots. Thus practically all the District's hay and grain never leaves the valley except in the form of sugar or dairy products or potentially as meat. Such sales as are made of grain and hay are mostly from one farmer to another. The stacks of hay remaining in the fields, which were observed when the District was visited in the Spring of 1933, were said to be exceptionally numerous because the cattle fed during the preceding winter were fewer than usual; in ordinary seasons the close of the feeding season would be accompanied by the depletion of the hay as well as the other feeds.

Security of the Beet Industry

The extreme rigidity characteristic of irrigation agriculture in many sections where a concentration on expensive crop specialties (such as orchards) has taken place, is not present in the Farmers' District, for other crops than sugar beets can be raised (although not now profitably), and beets could be abandoned at any time that another crop offered larger profits. Nevertheless, such an abandonment would represent a complete disruption of an agricultural routine now established by tenant farmers better satisfied with it than with any other system which might readily be substituted for it; the beet crop is marketed for cash, as are also its by-products and the other crops associated with it in the crop rotation by way of their translation into beef cattle and sheep; and the

profits from beet farming, while now non-existent for some of the farmers, hold out enough promise apparently to justify a continuance of the system even in the face of uncertainties such as those regarding the retention of present sugar tariff protection. In fact, beyond suggesting that a few crops of small bulk -- beans, for instance -- might have a more profitable prominence than that now given them, and that the dairy industry could perhaps stand expansion as soon as prices strengthen somewhat, no authority interviewed in the course of the examination of the District's affairs advised changes in the general agricultural set-up. In other words, hope was more or less general that current improvement in sugar quotations would continue to a point where, assisted by the lowered costs of raising beets, they would again represent a liberal profit to the farmer.

The Sugar Beet Contract

The annual report of the Great Western Sugar Company for the year ended February 28, 1933 (dated April 4, 1933), includes the following paragraphs:

"The 1932 beet crop was purchased under a contract which provided for payment on a participating basis dependent upon sugar content of beets and returns from the sale of sugar but without a guaranteed minimum payment. On delivery of the crop, payments were made to growers at an average rate of a little more than $4 a ton, varying among growers because of differing sugar content of their beets. If returns from sugar still to be sold are maintained at the current level, further payments to growers will be made.

"The general downward trend of the sugar market which has prevailed during recent years continued during the year under review, and the average net return for all sugar sold by the Company during this period was 50 cents a hundred pounds lower than for the preceding year. Values have recently shown some improvement, and raw sugar prices on the eastern seaboard are at this time about 35 cents a hundred above levels of a year ago, with an approximately corresponding increase in prices of refined cane sugar. Because of the smaller output which the Company will have to dispose of during the current year, it has been possible to restrict distribution to the more attractive sales territory, roughly embraced between the Mississippi Valley and the Rocky Mountains.....

"The beet contract offered for 1933 is on substantially the same basis as that of the past season. Contracting is now proceeding rapidly, with prospects that the planted acreage in the Nebraska, Wyoming, and Montana districts will somewhat exceed that of a year ago....."

Specifically, the standard 1932 contract provided that "the price per ton (2,000 lbs.) of beets ***** shall be determined upon the average net return per 100 pounds of sugar received by the Company from sugar manufactured at all factories of the Company," and sold during the period commencing October 1, 1932 and ending September 30, 1933, "and upon the average sugar content of all beets of the 1932 crop grown and delivered by the grower to the Company under this contract, in accordance with" a schedule of sugar percentages, ranging from 14 to 18, printed in the contract. This wording has been standard for several years, and as stated in the report above quoted, the contract differed from prior agreements chiefly (not solely) in the absence of a guaranteed minimum payment.

The following clause appearing in the 1933 contract, relative to deductions to be made in case of a change in tariff rates, distinguishes it from the 1932 contract. While the 1933 contract was not approved by the Nebraska Non-stock Cooperative Beet Growers Association, it was being acceded to more or less generally by the individual growers when the authors of this report were in the District:

> "Payments upon intermediate net returns for sugar and/or sugar content, or on net returns for sugar and/or sugar content higher or lower than those shown in the ***** schedule shall be in the same relative proportion; provided, however, that if, prior to the date of final settlement for beets under this contract, the import duty on refined and/or raw sugar in force at the date of the execution of this contract shall be reduced and the net return on sugar shall be less than $3.25 per 100 pounds, the price per ton of beets shall be the price determined as aforesaid, less a deduction of 1 per cent of such price for each five cents of decrease in net return per 100 pounds of sugar below $3.25, with proportional deductions from such price for decreases of fractional parts of five cents as aforesaid."

Cost of Raising Beets

In one sense, with four-fifths of the farms in the District paying their assessments through their landlords rather than through their operators, the cost of raising beets is of merely incidental interest in the present discussion since the problem of meeting it is principally the tenant's, not the owner's. Nevertheless, an inability to pay on the part of even one-fifth of the District lands means a heavy if not actually an insupportable additional burden on the other lands. Moreover, while temporary deficits can be withstood by tenant farmers as by any other producers, if costs (most of which the tenant must meet) continuously exceed returns, crop rentals will cease, farms will be abandoned, and the whole present system will be thrown into collapse.

A substantial reduction in the cost of raising beets has, in fact, been brought about in recent years, although apparently not in degree equal to the reduction in the price per ton declared in the annual contracts offered the farmers by the Sugar Company (1928, 1929 and 1930, $7.00; 1931, $5.50; 1932, $4.00 paid on delivery). Thus the average cost reported in 1928 by five farms in the adjacent Pathfinder Irrigation District, was $68.61 an acre (not inclusive of taxes, charges for water, depreciation and other capital costs); while the corresponding totals for 1931 and 1932 were $54.38 and $41.16. The items making up these totals are set out in Table 10. It should be noted that these do not specifically include taxes, assessments, or depreciation, interest, or overhead charges:

TABLE 10. Cost of Growing Sugar Beets, per acre, as Reported by Five Farms[1] in Pathfinder Irrigation District (Based on Actual Yields per acre)

Operation	1928	1931	1932
	Dollars	Dollars	Dollars
Plowing	2.91	2.55	1.91
Manuring	6.22	6.89	6.58
Discing[2]	4.06	0.62	0.52
Leveling	0.70	0.59	0.70
Harrowing	0.71	0.58	0.62
Planting	0.56	0.51	0.46
Seed	2.90	1.33	3.00
Rolling[3]	--	0.03	0.09
Scarifying[4]	--	--	0.05
Spraying[5]	1.64	--	--
Thinning[6]	2.98	7.09	5.56
Cultivating and ditching	6.06	3.04	2.59
Irrigating (labor)	3.21	3.02	2.24
Weeding[7]	0.97	2.96	2.20
Pulling[8]	0.94	2.90	1.15
Topping	19.84	9.31	6.67
Loading and hauling	14.91	12.94	6.83
Total	68.61	54.38	41.16

1/ The farms were different in the three years.
2/ Four farms only reported this operation in 1932; their average $0.55.
3/ One farm only reported this operation in 1931; its average $0.75. Two farms reported in 1932; their average $0.78. No farm reported in 1928.
4/ One farm only reported this operation in 1932; its average $1.00. No farms reported in 1928.
5/ One farm only reported this operation in 1928; its average $2.80.
6/ Three farms only reported this operation in 1928; their average $9.21.
7/ Three farms only reported this operation in 1928; their average $3.00.
8/ Four farms only reported this operation in 1928; their average $2.26.

The yields represented in Table 10 were exceptionally good, averaging 14.33 tons per acre in 1928, 16.98 tons per acre in 1931, and 16.48 tons per acre in 1932. (The corresponding 1931 and 1932 average for Farmers' District were 14.05 tons and 13.16 tons, respectively). Since the two last-named operations of "topping" and "loading and hauling" are done on a tonnage rather than an acreage basis, the corresponding totals for Farmers' District were probably a little lower than those shown in the table.1/

Even the recent low prices for beets provided a good margin above these costs. Thus at $5.50 per ton, Pathfinder District's 1931 crop returned a gross of $93.39 per acre from sugar alone, or $39.01 above the enumerated costs; while the 1932 crop grossed $65.92 an acre from sugar, or $24.76 more than these costs. Again it is to be remembered that the latter do not include taxes and district assessments; but excesses are obviously more than ample to cover them, as well as leaving a substantial residue for the payment of farm indebtedness, management wage, etc.

Average costs, as well as average yields, however, are made up of both low and high expenditures. This is shown emphatically by the record of the five farms represented in the 1932 column of Table 10. The cost of plowing, for instance, ranged from $1 to $3 per acre; cost of manuring, $2.72 to $13.50 an acre; discing, 25 cents to $1.70; leveling, 25 cents to $1.50; harrowing, 25 cents to $1; planting, 30 cents to $1; thinning, $5 to $11; cultivating and ditching, 50 cents to $4.50; irrigating, $1.65 to $7; weeding, $1 to $3; pulling $1 to $2.25; topping $6 to $9.45; loading and hauling $4.25 to $18. The lowest total per acre costs reported for the five 1932 farms was $37.05; the highest, $61.95. Corresponding 1931 extremes were $45.60 and $70.75.

Still further reduction in some of the average cost items listed may be possible. For instance, the price of seed (which is sold by the Sugar Company) was reduced from 15 cents per pound to 12 cents per pound in the Spring of 1933. (An average of about 20 pounds per acre is used). Users of phosphate fertilizers, which the Company also sells, will obtain it at $47.50 a ton, instead of $55 a ton as heretofore. Several of the operations involving hand labor (thinning, weeding, etc,) are usually handled on a contract basis, the labor being supplied by Russian or Mexican families or other groups who are paid for the season's work on an acreage basis. Contracts which a few years ago involved $22 an acre had been reduced in 1931 to $17 and some 1932 figures are said to have been around $13 to $15; while more of the work previously contracted was carried on by the farm families or other labor not engaged under contracts.

1/ Average yearly operating cost per acre of producing sugar beets in Weld County, Colorado, for the years 1922 to 1927, inclusive, was reported in Bulletin 353 of Colorado Agricultural Experiment Station ("Cost of Producing Crops on Irrigated Farms," by R. T. Burdick and H. B. Pingrey) as follows. (Note the difference in the items included in this accounting, as compared with the Pathfinder list, especially inclusion of "water tax", "real estate tax", "buildings", "tractor", "truck", "miscellaneous", and "overhead".): Man labor, $13.01; horse labor, $11.20; hand contract, $22.07; haul contract, $0.52; seed, $3.45; manure, $7.95; water tax, $2.59; real estate tax, $3.06; buildings, $0.71; equipment, $4.45; tractor, $0.71; truck $0.68; miscellaneous, $0.46; overhead, $3.56; total, $74.41.

However, while further opportunity for changes of this sort may exist, it is not believed that the savings can be comparable with those already made.

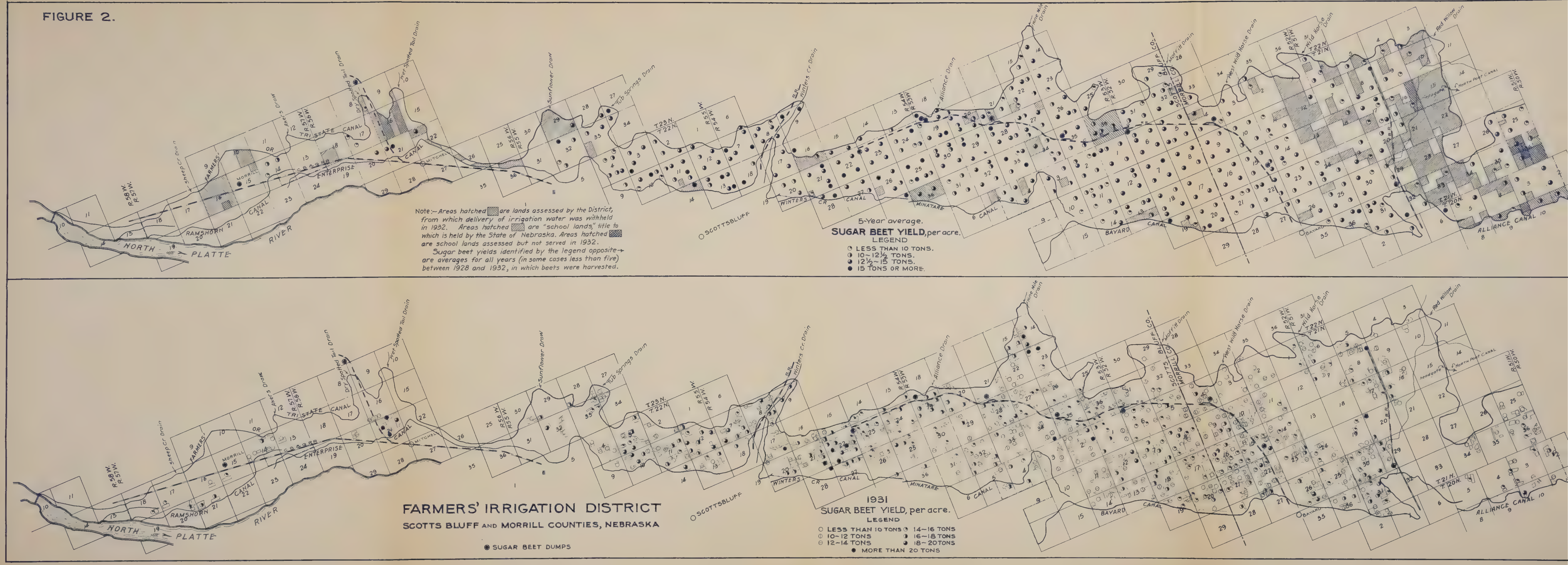
Range of Beet Yields

The variability of production costs applying to beets is no wider than the range of beet yields, regarding which complete and accurate information for the past five years has been made available by the Great Western Sugar Company. These data are summarized in Table 11 and are mapped in Figure 2, which also shows the location of lands on which beets were raised in 1931. The latter year the Company considered better representative of normal conditions than 1932, so far as relative distribution and yield were concerned, partly because of a destructive hail storm in the latter season.

Were it possible to obtain the District's average yield shown for either 1931 or 1932, from every assessed acre, presumably the farmers and their landlords would be universally prosperous and the District and its creditors free from financial worry, provided the average costs of production also applied to every acre or that the even better alternative but most elusive relationship of low costs and high yield could everywhere be established. Unfortunately the requirements of soil management and of pest control would not permit the complete devotion of the area to beets, even were every acre adapted to the crop. It is perhaps significant of the danger of too enthusiastic a concentration on the one crop, that 1928 and 1929, the years which, of the last five, showed the largest total acreages in beets were also the years of lowest average yields. Moreover, low yields are not necessarily produced at low costs nor high yields at high costs.

Table 11 appears, however, to disclose an encouraging trend by way of increasing yields with controlled acreage. Thus while the proportion of the total beet area which produced less than ten tons per acre was 18 per cent in 1928 and twice that proportion in 1929, in 1930, when a substantial reduction in the total was reported, the proportion represented by this low-yielding area was only four per cent, and in each of the two following years it was only nine per cent. A corresponding, though not so emphatic a trend was shown for the lands from which the yield was 10 tons but less than 12½ tons per acre. Conversely, whereas the 1928 and 1929 proportions represented by the lands raising 12½ but less than 15 tons per acre were 37 per cent and 19 per cent, respectively, they became 45 per cent in 1930, and while dropping to 30 per cent in 1931, came back to 43 per cent in 1932. Finally, the areas yielding 15 tons per acre, or more, were only six per cent and four per cent, respectively, in the first two of the five years; but in 1930 they were 33 per cent; in 1931, 41 per cent; and in 1932, 21 per cent. In 1930 the area raising 12½ tons per acre, or more, was 78 per cent of the total area in beets; in 1931 it was 71 per cent; and in 1932 it was 64 per cent; but in these years the total beet areas were several thousand acres less than those of 1928 and 1929, when the high-yielding lands comprised only 43 per cent and 23 per cent of the totals, respectively.

FIGURE 2.



FARMERS' IRRIGATION DISTRICT
SCOTTS BLUFF AND MORRILL COUNTIES, NEBRASKA

TABLE 11. Sugar Beet Production of Farmers' Irrigation District, 1928-1932.

	Period Average	1928	1929	1930	1931	1932
Farms in District[1/] ..... Number	920	920	920	920	920	920
Farms growing beets ..... Number	411	407	429	409	395	416
Proportion of total ..... Per cent	45	44	47	45	43	45
Area of District[1/] ..... Acres	62,513.00	62,513.00	62,513.00	62,513.00	62,513.00	62,513.00
Area in beets ..... Acres	16,707.33	20,277.82	19,731.63	16,350.13	13,171.59	14,005.45
Proportion of total ..... Per cent	27	32	31	26	21	22
Average yield of beets, per acre ..... Tons	12.57	11.97	10.71	13.89	14.05	13.16
Area yielding less than 10 tons, per acre .... Acres	2,853.03	3,610.14	7,556.93	589.27	1,226.09	1,282.73
Proportion of total area in beets ..... Per cent	17	18	38	4	9	9
Area yielding 10 tons but less than ..... Acres	5,004.11	7,969.18	7,730.51	2,970.64	2,562.99	3,787.18
$12\frac{1}{2}$ tons, per acre						
Proportion of total area in beets ..... Per cent	30	39	39	18	19	27
Area yielding $12\frac{1}{2}$ tons but less than ..... Acres	5,707.94	7,528.18	3,721.71	7,382.51	3,928.94	5,978.38
15 tons, per acre						
Proportion of total area in beets ..... Per cent	34	37	19	45	30	43
Area yielding 15 tons or more, per acre ..... Acres	3,142.25	1,170.32	722.48	5,407.71	5,453.57	2,957.16
Proportion of total area in beets ..... Per cent	19	6	4	33	41	21

1/ Tracts separately assessed by the District, including "town lots, railroad right of ways, and small tracts." These include many tracts not now farmed. District officials estimate the number of active farms as 725. The figure in each column is that reported in 1932.

The Burden on Beet Profits

Notwithstanding the restrictions, natural and artificial, in the way of substantially expanding the beet area, the beet industry is in somewhat of the same situation that football occupies in a college season of athletics; its profits have to make up the deficits of the other farm activities which are essential in a well-balanced farm business but not always money-makers in themselves. Thus potatoes, if raised at the cost of $44.63 per acre reported by five farms in the Pathfinder District in 1932[1], represented a loss of $27.41 an acre even before the payment of taxes, assessments, capital charges, and management wages, if given the value of 9-3/4 cents[2] per bushel cited in the Pathfinder report, and a profit, (but before payment of the additional items) of only $11.41 if given the value of 31 cents a bushel which was the 1932 (December) average price for the State. Similarly alfalfa, if sold in the stack at the $3.50 a ton quotation which was current when the District was visited, would produce little more than the taxes and 1932 District assessments levied against best lands, providing practically nothing with which to meet other inescapable costs, since two tons per acre is the average alfalfa yield. No better appearance is given the general circumstances by barley at 12 cents a bushel (40 bushels an acre), or corn at 19 cents a bushel (20 bushels an acre), and the more or less philosophical willingness to consider losses in growing the feed crops as representing an expenditure for fertilizer (where the crops are fed, not sold) is somewhat strained by such prices. On a continuation of that basis, the fertilization costs more than it is worth, and since the feeding industry has its best justification, even in good times, in its provision of manure for the beet fields, a lack of improvement of present market conditions would render difficult the calculation of a basis upon which feeding could hold its own.

In the absence of crop census figures for the Farmers' District itself, the following summarization (Table 12) of records from the neighboring Gering and Fort Laramie Irrigation District are believed to picture the crop situation much as it exists also in the Farmers' District. Notable in this showing is the fact that 70 per cent of the gross income of the Gering and Fort Laramie District farmers in 1932 was contributed by sugar beets, notwithstanding the 27 per cent reduction in the price paid for beets that year as compared with the 1931 price, while the corresponding proportion for 1931 was only one per cent less than that for 1930, although the price was down 21 per cent. (The 1931 and 1930 income percentages were 65 and 66 respectively).[3] Notable also is the comparison of these gross income percentages with the proportions of the "district land in beets" (1932, 26 per cent; 1931, 24 per cent; 1930, 27 per cent.)

1/ The corresponding 1928 figure was $79.90; 1931, $63.41.

2/ This figure took account of prices received for damaged potatoes in areas affected by frost. Fifteen cents was received for other potatoes.

3/ D. J. Roach, of the Great Western Sugar Company, estimates the following gross returns from crops for the Nebraska area of North Platte Valley.

	1929	1930	1931	1932
Sugar beets	$85.06	$103.11	$79.00	$54.00
All other crops	23.87	16.82	14.73	9.17

The proportions of the annual totals represented by beets were: 1929, 78.1 per cent; 1930, 84.3 per cent; 1931, 84.3 per cent; 1932, 85.5 per cent.

TABLE 12. Crop Census - The Gering & Fort Laramie Irrigation District, 1927-1932

Item	1927	1928	1929	1930	1931	1932
Sugar Beets						
Area .....Acres	10,614	12,520	14,684	13,881	12,378	12,968
Yield, per acre .....Tons	11.96	11.89	12.77	15.40	14.44	14.78
Total .....Tons	126,980	148,917	187,458	213,722	178,761	191,637
Value, per ton .....Dollars	8.00	7.00	7.00	7.00	5.50	4.00
Gross Income, per acre ...Dollars	95.71	83.26	89.36	107.78	79.43	59.11
Total Gross Income .....Dollars	1,015,840.00	1,042,419.00	1,312,206.00	1,496,054.00	983,186.00	766,548.00
Other Crops						
Area .....Acres	34,851	35,741	34,558	37,027	38,802	36,556
Gross Income, per acre ....Dollars	14.32	17.09	30.46	20.85	13.84	8.87
Total Gross Income .....Dollars	499,176.00	610,962.00	1,052,734.00	771,891.00	537,032.00	324,121.00
All Crops						
Total Area Cropped .....Acres	45,465	48,261	49,242	50,908	51,180	49,524
Gross Income, per acre ....Dollars	33.54	34.26	48.02	44.55	29.70	22.02
Grand Total Income .....Dollars	1,515,016.00	1,653,381.00	2,364,940.00	2,267,945.00	1,520,218.00	1,090,669.00
Proportion of:						
District Land in Beets ...Per cent	23	26	30	27	24	26
Total Gross Income derived from Sugar Beets..Per cent	67	63	54	66	65	70
Total Gross Income derived from Other Crops..Per cent	33	37	44	34	35	30

TABLE 13. Crop Census[1] - Pathfinder Irrigation District, 1927-1932

Item	1927	1928	1929	1930	1931	1932
Sugar Beets[2]						
Area .....Acres	15,169	14,785	16,226	13,582	10,820	11,135
Total .....Tons	188,137	189,858	194,899	194,005	143,539	157,126
Value, per ton Dollars	8.10	7.15	7.10	7.10	5.60	4.10
Gross Income, per acre ....Dollars	100.46	97.81	85.34	101.42	72.96	57.86
Income .....Dollars	1,523,909.00	1,357,484.00	1,383,783.00	1,377,436.00	804,072.00	644,217.00
Other Crops						
Area .....Acres	67,677	69,979	67,626	71,734	74,581	69,548
Gross Income, per acre ....Dollars	122.00	99.65	189.84	132.27	61.45	39.90
Income .....Dollars	939,998.00	990,985.00	1,801,341.55	1,376,559.00	776,010.00	457,785.00
All Crops						
Total Area Cropped .....Acres	82,846	84,764	83,852	85,316	85,401	80,683
Gross Income, per acre ....Dollars	222.46	197.46	275.18	233.69	134.41	97.76
Income .....Dollars	2,463,907.00	2,348,469.00	3,185,125.00	2,753,995.00	1,580,082.00	1,102,002.00
Proportion of:						
District Land in Beets ...Per cent	18	17	19	16	13	14
Total Gross Income derived from Sugar Beets..Per cent	62	58	43	50	51	58
Total Gross Income derived from Other Crops..Per cent	38	42	57	50	49	42

1/ Does not include Irrigated Pasture (Alfalfa, Sweet Clover, Misc.), or Alfalfa and Sweet Clover Seeding, 1932.
2/ Beets and tops.

Corresponding data for Pathfinder Irrigation District appear in Table 13.

Of similar interest is Table 14, representing both Gering and Fort Laramie and Pathfinder Districts, in which are shown the average per acre gross income produced by the different crops raised in the Districts in 1932. (An expansion of this table, showing these data by the five soil classes used for assessment purposes, appears in the Appendix.)

TABLE 14. Average Per Acre Gross Income, by Crops, Gering and Fort Laramie, and Pathfinder Irrigation Districts, 1932.

Crop	Average Gross Income, Per Acre	
	Gering and Ft.Laramie[1/] District	Pathfinder District
	Dollars	Dollars
Hay: Alfalfa	11.16	9.64
Miscellaneous	1.40	--
Native	3.64	--
Beets: Stock	25.00	--
Sugar	59.11	57.86[2/]
Tops	1.48	
Beans	14.47	--
Barley	5.80	4.75
Cane	2.62	--
Corn: Indian	6.10	3.95
Pop	7.38	--
Fodder	5.96	--
Garden	30.00	--
Oats	6.23	5.01
Onions	25.76	--
Pasture: Miscellaneous	4.00	1.91
Native	1.00	--
Potatoes	9.09	10.65
Seed: Alfalfa	3.02	--
Wheat	5.01	2.53
Watermelons	43.00	--
Cabbage	24.96	--
Aggregate average, 1932	22.02	12.90
Corresponding aggregate averages for previous years were as follows:		
1931	29.70	18.02
1930	44.55	31.33
1929	47.98	36.85
1928	34.26	26.84
1927	33.54	29.02

1/ See Appendix F for segregation of these data by productive soil classes.
2/ Sugar plus tops.

Recent Business Records of Typical Farmers

As depicting best, of the available data, the results obtained from farming in the irrigated area of Scotts Bluff and Morrill Counties, a tabular series of annual farm business reports for the years 1929, 1930, and 1931 has been consolidated for convenience in considering the affairs generally typical of those irrigators in Farmers' Irrigation District.[1] These reports involved the accounts of 27 farmers in 1929, 29 farmers in 1930, and 20 farmers in 1931. They were summarized cooperatively by the University of Nebraska (Agricultural College Extension Service and Rural Economics Department), the United States Department of Agriculture, and the Scotts Bluff and Morrill Counties Farm Bureaus. The complete summary appears as Appendix G, but its essentials are abbreviated as Table 15.

Table 15 shows in the averages for all farms, the precipitate downward trend of returns from farming in Nebraska's irrigated area which has characterized farming elsewhere during recent years. Net receipts per acre were fairly substantial in 1929; were sufficient to cover expenses and leave a labor and management wage more than enough to provide the family living.[2] The average for the group of most profitable farms was even more satisfactory. The least profitable farms did not clear enough for a satisfactory living even in this relatively prosperous year.

The latter statement applied to the average farm in 1930, and while the more prosperous group that year on the whole did very well, the least prosperous did not clear expenses.

In 1931 the average farm's expenses exceeded its receipts by a substantial amount. This deficit was much greater for the less prosperous group, while the average wage of the most prosperous farmer fell short of providing the estimated satisfactory living.

Position of the Landlord

While the foregoing discussion is pertinent in a consideration of the owner-operator farmer's ability to meet taxes and District assessments, the heavy preponderance of tenantry and the corresponding fact that in the case of rented farms these charges are paid out of the rentals received by the landlords call for an examination of the circumstances of the latter. Many of the landlords are not residents of the District; many who are residents have not kept year-to-year and crop-by-crop records of their rental receipts; and not many of the relatively few who have such records care to disclose them.

1/ Corresponding figures for 1932 were not available when preparation of this report was concluded, but were expected to be made public shortly thereafter.

2/ Estimated by D. J. Roach, of the Great Western Sugar Company, as $1500.00 for 1929, $1500.00 for 1930, $1000.00 for 1931, and $750.00 for 1932.

TABLE 15. Farm Business Records of Selected Irrigated Farms in Scotts Bluff and Morrill Counties, Nebraska, 1929-1931. (Figures in parentheses show number of records.)

Factors Useful in Analyzing the Farm Business	Average, All Farms			Average, Most Profitable Farms			Average, Least Profitable Farms		
	1929 (27)	1930 (29)	1931 (20)	1929 (10)	1930 (10)	1931 (7)	1929 (10)	1930 (10)	1931 (7)
Area of farm .....Acres	170	261	176	227	207	112	115	279	246
Area in crops .....Acres	129	148	116	153	149	95	98	143	126
Proportion of land tilled .....Per cent	75.6	62.8	70.2	67.2	75.9	87.0	84.7	60.7	58.5
Gross receipts, per acre .....Dollars	37.40	17.08	13.66	33.37	30.40	29.90	46.35	9.26	6.07
Total expenses, per acre .....Dollars	22.88	15.20	16.62	14.15	18.66	23.44	39.27	14.58	13.20
Net receipts, per acre .....Dollars	14.52	1.88	-2.96	19.22	11.74	6.46	7.08	-5.32	-7.13
Land investment, per acre[1] .....Dollars	86.00	46.00	54.00	64.00	65.00	64.00	125.00	32.00	35.00
Total investment, per acre .....Dollars	117.00	74.00	85.00	86.00	95.00	99.00	164.00	63.00	61.00
Receipts less expenses .....Dollars	2470.00	1420.00	193.00	4367.00	3447.00	1377.00	815.00	-745.00	-916.00
Total unpaid labor .....Dollars	129.00	930.00	715.00	195.00	1017.00	654.00	10.00	740.00	840.00
Net income from investment and management .....Dollars	2341.00	490.00	-522.00	4172.00	2430.00	723.00	805.00	1485.00	-1756.00
Rate earned on investment .....Per cent	[2]	2.90	-3.20	[2]	13.55	7.47	[2]	-7.32	-13.84
Return to capital and operator's labor and management .....Dollars	[2]	1186.00	78.00	[2]	3150.00	1324.00	[2]	-837.00	-1156.00
Labor and management wage .....Dollars	1727.00	220.00	-674.00	3418.00	2167.00	772.00	278.00	-1713.00	-1912.00

1/ Value of land and buildings, 1929.
2/ Not reported.

However, what appears to be an excellent record has been supplied by Mr. Fred D. Beltner, resident of a farm in the District near Bayard, who, as an employee of an estate, has managed a large group of farms scattered throughout the District, since 1920. Their total present area is 2720 acres. The acreage and yield of each crop raised on these farms are summarized in Table 16, which also shows the value of the portion of each crop received as rent, with, in a final column, the average rent received per cropped acre.

The table shows that, ignoring the probability of further receipts for 1932 sugar, the cropped acreage of the farms paid the owner the high rental of $26.02 per acre in 1920 and the low of $8.96 in 1932; the average for the period was $17.07. These receipts were supplemented substantially in most years by profits from stock-feeding operations, and by threshing machine earnings. Recently the profits from feeding were reversed into heavy losses, so that for the entire period (up to the autumn of 1932) the total profit from this end of the business was $5,494.16, an annual average of only $422.63, or 16 cents an acre. In fact, during the last three years of the record, the previously accumulated profit from feeding, $22,000, was reduced by approximately $16,500, an average annual loss for the three years of $3,300, or $1.21 per acre. (Of the three, the last year is understood to have represented the severest loss, but figures are not available to show this, and the average of the three will be used in computations below.)

Likewise with the threshing machine rentals. For the entire period, these averaged $390.37, or 14 cents an acre; but losses instead of profits represented the last three years' operations, reducing the previously accumulated profit of $6,359.92 to $5,074.84. The loss, spread over the three years, was $428.36, or 16 cents an acre, per year.

Moreover, the averages in Table 16 represent cropped acreages, whereas taxes and assessments apply to the entire farm areas. Hence the 1932 average rental, considered on this basis, should be taken as $7.48 per acre. Reduced by $1.21 and $0.16, it became $6.11.

In addition to these deductions, the estate paid Mr. Beltner a salary, and met incidental management expenses averaging, together, $1.41 per acre, per year. These deductions still further reduced the estate's 1932 income to $4.70 per acre. Assuming that the 18 scattered farms represent the best lands in the District, this return fell about $2.05 short of meeting taxes and District assessments. There was no income to be credited to return on capital investment, of course.

Similar computations reduce the 1930 income to $5.54 per acre and the 1931 income to $1.31 per acre, after the payment of taxes and assessments.

It is to be said for these records, that they undoubtedly represent a superior type of management--that is, one not typical of the average rented farm in the District. Moreover, they disclose a circumstance which is out of line with the favored crop rotation policy generally followed in the District. Except for three years when the proportion was slightly less, Mr. Beltner has consistently kept more than half of his cropped acreage in

TABLE 16. Farm Business Record of 18 Farms[1/] Managed by Fred D. Beltner, Bayard, Nebraska, 1920-1932.

Year	Hay				Oats				Barley			
	Area	Yield	Rent	Av.Rent per acre	Area	Yield	Rent	Av.Rent per acre	Area	Yield	Rent	Av.Rent per acre
	Acres	Tons	Dollars	Dollars	Acres	Bushels	Dollars	Dollars	Acres	Bushels	Dollars	Dollars
1920	393.98	1,046.14	4,352.65	11.05	190.50	12,478.04	3,645.21	19.13	--	--	--	--
1921	465.27	1,486.93	4,464.20	9.59	307.70	12,868.44	1,799.81	5.85	--	--	--	--
1922	384.40	1,185.45	5,936.72	15.44	289.50	12,569.98	1,825.55	6.31	134.50	4,813.69	966.38	7.18
1923	390.51	1,005.28	3,240.03	8.30	245.50	12,105.00	1,667.37	6.79	302.00	11,636.70	2,369.18	7.84
1924	622.04	1,728.54	6,908.83	11.11	276.00	16,509.50	2,943.43	10.66	279.50	9,514.25	2,334.24	8.35
1925	652.74	2,316.46	9,833.74	15.07	253.15	13.892.19	2,481.16	9.80	206.00	10,482.00	2,365.19	11.48
1926	607.66	2,130.09	8,506.70	13.99	174.70	11,147.65	2,008.61	11.50	259.80	12,488.63	2,720.56	10.47
1927	664.10	1,844.10	7,314.39	11.01	167.60	10,793.24	1,941.12	11.58	255.55	12,826.09	3,046.14	11.92
1928	447.89	995.62	4,875.28	10.88	213.16	15,637.10	2,782.46	13.05	324.62	16,992.78	4,080.78	12.57
1929	392.42	1,188.65	5,952.24	15.17	230.75	10,871.55	1,934.90	8.39	368.24	19,126.82	4,590.62	12.47
1930	557.00	1,315.54	3,738.63	6.71	180.50	11,012.51	1,396.03	7.73	396.50	26,629.00	5,331.80	13.45
1931	386.00	1,000.28	3,000.69	7.77	144.00	9,957.75	995.28	6.91	493.00	24,586.88	2,952.56	5.99
1932	414.00	897.93	2,184.46	5.28	194.00	12,514.60	849.99	4.38	486.00	26,599.28	2,126.68	4.38
Av.for the period	490.62	1,395.46	5,408.35	11.02	220.54	12,489.04	2,020.84	9.16	318.70	15,972.37	2,989.47	9.38

TABLE 16. Contd. 2.

Year	Wheat				Sugar Beets				Total Cropped Area	Total Rent	Av. Rent per acre Cropped
	Area	Yield	Rent	Av.Rent per acre	Area	Yield	Rent	Av.Rent per acre			
	Acres	Bushels	Dollars	Dollars	Acres	Tons	Dollars	Dollars	Acres	Dollars	Dollars
1920	382.50	13,122.45	10,177.76	26.61	836.75	10,008.66	28,750.83	34.36	1,803.73	46,926.45	26.02
1921	173.00	4,011.98	1,379.17	7.97	1,041.77	11,786.97	17,597.92	16.89	1,987.74	25,241.10	12.70
1922	254.50	6,228.22	2,060.62	8.10	1,100.16	17,501.79	29,562.71	26.87	2,163.06	40,351.98	18.66
1923	--	--	--	--	1,095.96	11,552.52	19,639.31	17.92	2,033.97	26,915.89	13.23
1924	--	--	--	--	1,092.71	15,952.47	26,485.59	24.24	2,270.25	38,672.09	17.03
1925	--	--	--	--	1,054.03	19,151.64	26,811.97	25.44	2,165.92	41,492.06	19.16
1926	--	--	--	--	1,256.82	18,407.24	33,720.10	26.83	2,298.98	46,955.97	20.42
1927	24.00	430.80	128.16	5.34	1,258.67	17,514.10	33,079.16	26.28	2,369.92	45,508.97	19.20
1928	--	--	--	--	1,379.77	17,621.94	32,937.54	23.87	2,365.44	44,676.06	18.89
1929	--	--	--	--	1,385.48	13,685.54	25,283.00	18.25	2,376.89	37,760.76	15.89
1930	--	--	--	--	1,188.19	17,059.58	30,531.05	25.70	2,322.19	40,997.51	17.65
1931	--	--	--	--	1,072.53	15,528.88	22,525.61	21.00	2,095.53	29,474.14	14.07
1932	--	--	--	--	1,177.59	14,446.26	15,198.31 2/	12.91	2,271.59	20,359.44	8.96
Av.for the period	208.50	5,948.36	3,436.43	16.48	1,149.26	15,401.35	26,317.16	22.90	2,194.25	37,333.26	17.07

1/ Sixteen farms, 1920; 15, 1921; 17, 1922; 18 thereafter.

2/ Calculated on the basis of ½ the $4.00 per ton average advance payment by the Great Western Sugar Company, plus the value of the tops. Anticipated later payments from the Company may increase this.

sugar beets.1/ (The average for the entire period has been 52 per cent.) The effort of the Sugar Company, it will be remembered, is to keep the beet acreage at no more than one-third of the total. Thus, while the yield per acre from the Beltner farms was less in 1932 than the average for the District (possibly because of this excessive sugar beet proportion and its long continuance), the profits from beet production, even in 1932, meant a better total income from the farms than could have resulted from adherence to the more or less universally recommended and generally-followed rotations. Had Mr. Beltner's 1932 beet acreage been only one-third of his total cropped area, and had the whole remaining two-thirds been in the other crops listed, then had the average per acre rental of both beets and the other crops been the averages actually received, the average per acre rental for the entire cropped area would have been $6.13 instead of the $8.96 reported -- or, divided by the entire 2720 acres in the farms, $5.12, which, when reduced by feeding and threshing-machine losses and salary and incidental management expenses, would have left only $2.34 with which to pay taxes and assessments -- approximately $4.41 less than was required. The same reasoning applied to 1930 and 1931 operations would have left in the former year a surplus, after payment of taxes and assessments, of $3.04 per acre, but a deficit in the latter year of 65 cents per acre.

It appears, therefore, that on the basis of the generally-recommended crop rotation but with no change in the results of feeding and threshing operations, only 1930, of the last three years, would have produced a surplus which could be credited as return on capital investment, and even that return was six per cent on a farm valuation of only $50. an acre. Moreover, it takes into account an apparently insufficient allowance to cover depreciation of buildings and equipment. These farms a few years ago were valued much higher than $50. an acre, and in normal times would doubtless bring a much better figure than that.

Yields of Different Assessment Classes

The lands producing beets during the five-year period in question (1928-1932) have been identified according to their classifications for district assessment purposes and the average yields computed for each of the valuation classes. The results appear in Table 17.

1/ In a letter to the authors, Mr. Beltner explains his ability to keep so high a proportion of his acreage in beets as due to "careful rotation and persistent fertilizing". He continues:

> "In addition, all small grain acreage is either seeded to sweet clover or alfalfa without exception every year. Having broken a large portion of this land from virgin soil and seen its development since, I think the above tells the whole story.
>
> "In the earlier stages farmers claimed that this land would require no fertilizer for 40 years, but I bought all of neighborhood straw and converted it into fertilizer. In recent years this straw has become less available and we have been forced to go farther out--at times 25 miles--but have kept right on building soil. In my own mind I never sacrifice soil fertility for crops.
>
> "We have used very little commercial fertilizer but have shipped in barnyard manure from Alliance and Sidney by the dozens of car loads.
>
> "Another thing: We picked some of the best land in the Valley to begin with; then put up good improvements and thereby attracted the best tenants, all of which connected with close supervision, has produced fairly good results."

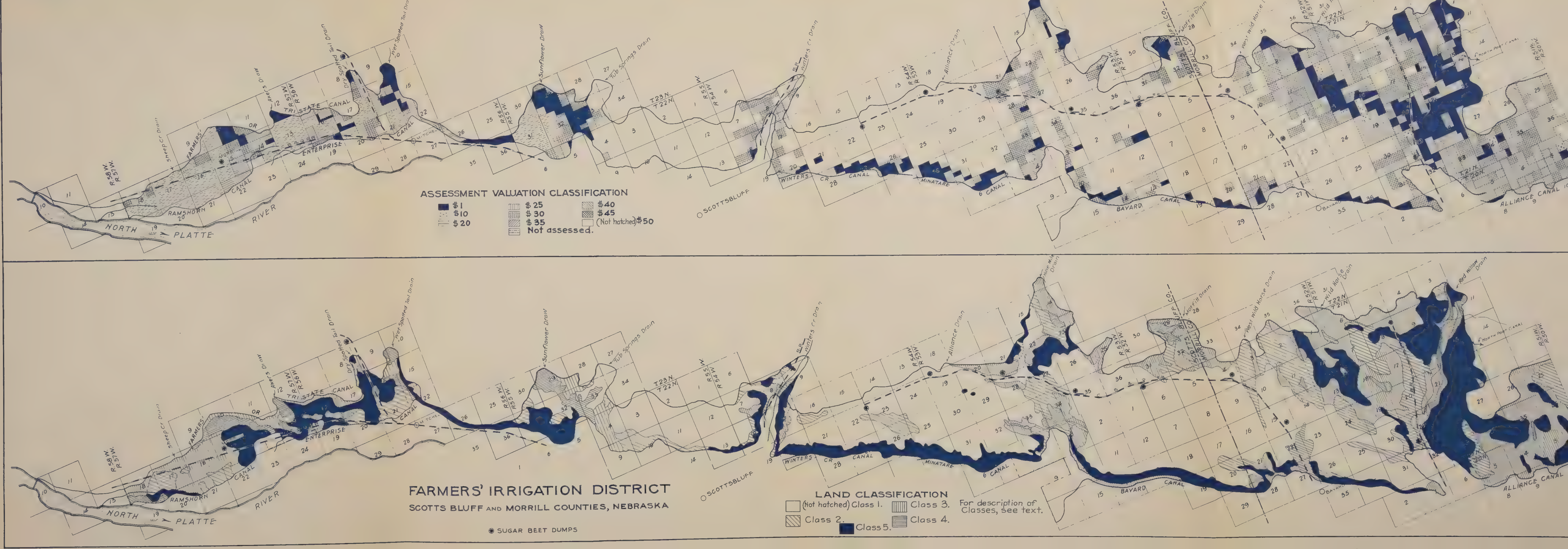
TABLE 17. Five-year average yields of beets, 1928-1932, for lands of different assessment classes.

Assessed value per acre	Area Reporting			Yields per acre		
	Total period	Annual Average				
		Area	Proportion of district assessed area in valuation class	Weighted 5-year average	Maximum	Minimum
	Acres	Acres	Per cent	Tons	Tons	Tons
$50	63,116.61	12,623.32	38	12.83	18.27	6.39
45	11,416.03	2,283.21	38	11.98	17.72	6.90
40	7,401.67	1,480.33	22	12.01	17.11	3.24
35	1,556.02	311.20	20	11.47	13.91	5.20
30	1,172.14	234.43	11	10.98	13.03	8.72
25	501.32	100.26	11	10.48	15.00	8.31
20	1,075.46	215.09	12	12.22	15.07	10.38
10	63.18	12.64	4	10.75	11.48	9.88
Totals and averages	86,302.43	17,260.48 1/	33	12.57	18.27	3.24

1/ This average exceeds that in Table 11 by some 554 acres, due to the fact that some tracts contained sugar-beet areas in more than one classification and are therefore included in more than one group in the above table (Table 17).

The most striking feature of this table is the narrow range of average yields in the several classes. So far as averages are concerned, the $50 land during the past five years has produced only 1½ tons per acre more than the $25 land. Of course, in appraising these results proper weight must be accorded the differences in basic data. The averages on $50 land are considerably more reliable than those on lands of lower valuations; for not only has the $50 class the great preponderance of beet land in the district, but its beet area is 38 per cent of the entire $50 assessment class and therefore considerably more representative of its class than is the 11 per cent of $25 land or the 4 per cent of $10 land.

FIGURE 3.


ASSESSMENT VALUATION CLASSIFICATION
$1
$10
$20
$25
$30
$35
Not assessed.
$40
$45
(Not hatched) $50
NORTH PLATTE RIVER
TRI STATE CANAL
ENTERPRISE
RAMSHORN CANAL
FARMERS' CANAL
WINTERS CR. CANAL
MINATARE CANAL
BAYARD CANAL
ALLIANCE CANAL
SCOTTSBLUFF
BAYARD
SCOTTS BLUFF CO.
MORRILL CO.
FARMERS' IRRIGATION DISTRICT
SCOTTS BLUFF AND MORRILL COUNTIES, NEBRASKA
SUGAR BEET DUMPS
LAND CLASSIFICATION
(Not hatched) Class 1.
Class 2.
Class 3.
Class 4.
Class 5.
For description of Classes, see text.

FARM INCOME IN RELATION TO FIXED CHARGES

Crop yields within the District, as stated elsewhere in this report, have been determined with great precision for sugar beets but are not sufficiently available for other crops. However, complete production figures are available for Pathfinder Irrigation District, which adjoins Farmers' District throughout practically its entire length. It was the opinion of well informed local persons interviewed that average crop yields in Pathfinder District on the whole are fairly representative of those in Farmers' District; that any differentiation would favor Farmers' in case of most crops, and Pathfinder in case of potatoes. For the purpose of this discussion the average Pathfinder yields over the 5-year period 1928-1932 are being used for all crops except sugar beets, and for the latter the Great Western Sugar Company's exact figures on Farmers' District.

Appendix H gives the average farm prices over the 10-year period 1923-1932; for sugar beets, from data provided by the Sugar Company; for all other crops, from reports of Pathfinder District.

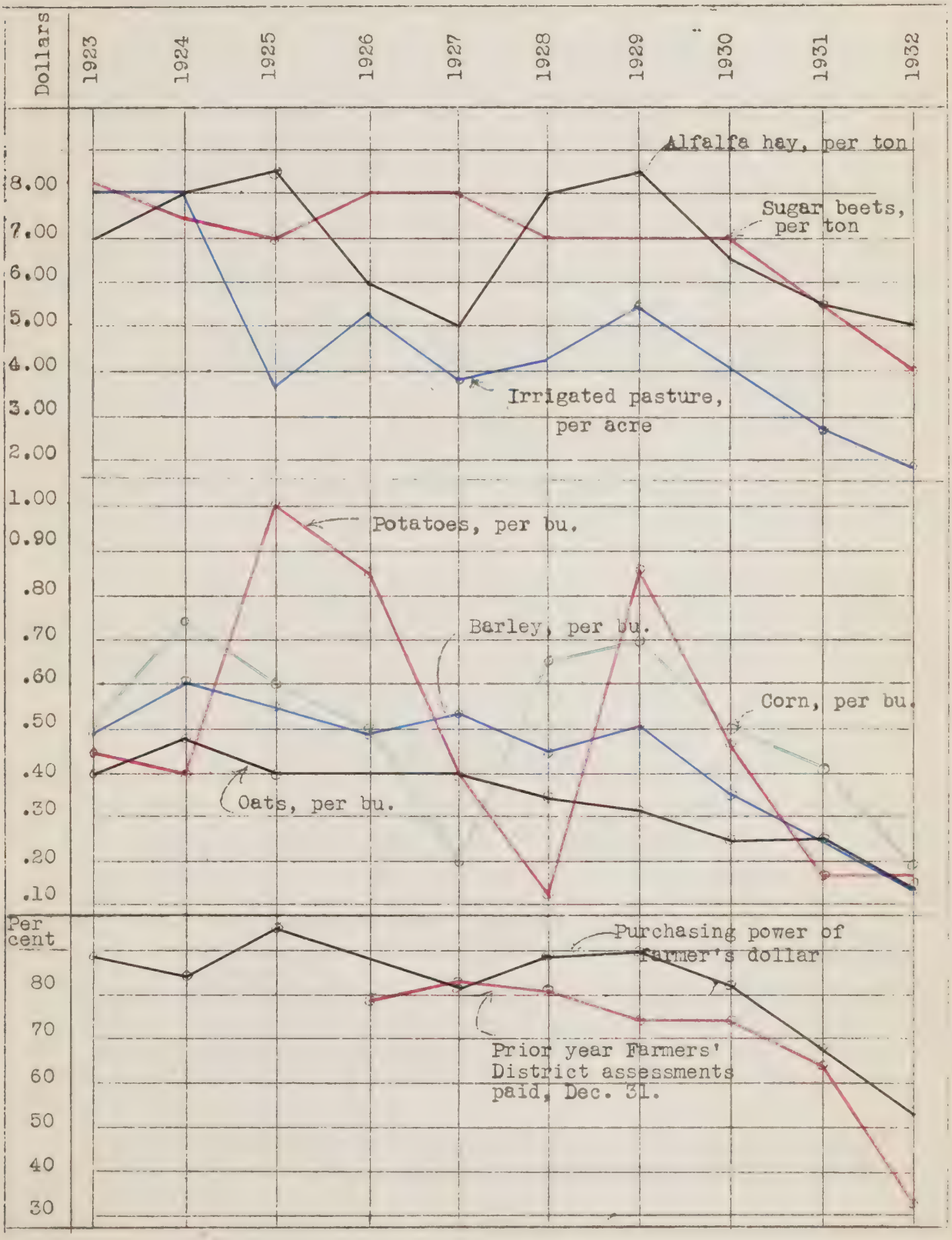
The accompanying chart (Figure 4) depicts the course of these prices and serves to emphasize several points of interest in the present study. To permit this, the chart also shows the course of assessment payments made by the holders of property in Farmers' District since the 1926 refinancing.

Most important of the points emphasized is the fact that the falling off in payments of District assessments has been no more precipitate during the last three years than the deflation of crop prices -- in fact, the harmony between payments and prices is very striking, at least for the period 1930-32, and although payments during the prior years displayed a generally downward trend, they held up better than the prices of several important crops.

Despite the recent substantial reduction in the prices paid for sugar beets, the fluctuations shown for this crop are not, in degree of severity, comparable with those shown for other crops -- as, for instance, alfalfa hay, potatoes, or corn. In fact, the curve serves to emphasize what has already been stressed in preceding pages of this report -- the fact that beets are the substantial foundation of the entire community's agriculture. Indeed, it is notable, in connection with remarks in the preceding paragraph, that the 43 per cent decline in the price of sugar beets between 1930 and 1932, was closely approximate to the decline in payments of District assessments.

Comparison of the beet curve with the potato curve is interesting especially because of the more favorable place once occupied by potatoes in the agriculture of Farmers' District. Thus in the course of three seasons the price received by farmers descended from a high point of $1.05 per bushel to 13 cents a bushel, and in the year succeeding that low point, it returned to 87 cents, thereupon, however, retracing its course almost to its previous low in the 1932 season.

Figure 4. - Prices received by farmers for principal crops, Pathfinder Irrigation District, and purchasing power of the farmer's dollar, United States, 1923 to 1932; and proportion of prior year assessments paid December 31 , Farmers' Irrigation District, 1926 to 1932.



While not quite so extreme, the fluctuations of corn prices were of like severity, as were also those of alfalfa hay. On the other hand, while prevailingly downward, the courses of barley and oats prices were relatively steady, although somewhat accelerated in the most recent years.

Despite the fact that its influence does not appear in the curve showing the trend of assessment payments, the break in prices (other than those for beets) which followed 1925 may possibly have had more than a little to do with the delinquencies of later years. The refinancing which established the present bond set-up took place as of January 1, 1926, or before the full effects of the 1925-27 price movements could be anticipated. Again considering the beet curve in this connection, it nevertheless appears that the severe 1925-27 decline in returns from other crops was nullified by the favorable price paid for beets. If this is true, it merely goes further to show the stabilizing influence of the beets as well as the relative unimportance of the other crops.

Also charted in Figure 4 is the course taken by the purchasing price of the American farmer's dollar throughout the period (1923-1932), as measured by the ratio of prices he received for his products to the prices paid for the things he has had to buy. This curve is based upon statistics published by the Bureau of Agricultural Economics of the United States Department of Agriculture. (See "The Agricultural Situation", April, 1933.) While representing the farming situation of the entire nation, it is believed to apply fairly well to the circumstances of agriculture in North Platte Valley.

This curve is harmonious with the other charted data, and at least suggests the extent of the difficulty farmers have experienced in meeting fixed obligations (such as the District's bond assessments) with a dollar which, at the close of 1932, had a purchasing power of only 50 cents as compared with 89 cents in 1923 and 95 cents in 1925.

Yields and Income for Assumed Cropped Area of 50,000 Acres

Appendix I gives the crop yields and gross farm income for a cropped area of 50,000 acres, which probably fairly approximates the current series of a few years. The area is being divided among the several crops in the proportion indicated at the beginning of the chapter entitled "Type of Agriculture and Returns from Farming," the "smaller proportions in other small grains, beans, and gardens" being classed in this table as "Miscellaneous." The sugar beet area (33 per cent of the total cropped area) is subdivided into four groups according to the ratio given for the average 5-year period in Table 11; that is, Group 1 contains all areas with average production of less than 10 tons per acre; Group 2, 10 or more tons but less than 12½; Group 3, 12½ or more but less than 15; and Group 4, 15 tons and over. Crop yields are as explained above, and annual gross income is computed from prices given in Appendix G.

The total annual gross income for this assumed area, based upon price levels in each of the years under consideration, and the landlords' share, follow:

	Total annual gross income	Landlords' share [1]
1923	$2,313,715	$628,573
1924	2,233,695	617,807
1925	2,176,293	602,228
1926	2,425,117	651,534
1927	2,190,417	587,131
1928	1,950,379	541,508
1929	2,299,809	631,507
1930	2,011,304	545,020
1931	1,494,516	407,227
1932	1,071,914	292,943
Average 1923-1929	2,227,061	608,613

It will be noted that the gross income, and also the landlords' share, for the past three years bear the following relationship to the 1923-1929 average:

1930	90 per cent
1931	67 " "
1932	48 " "

The 1931 irrigation levy for all purposes was $264,030.36, and the general tax levy on District lands $83,312.52, or a combined total tax requirement of $347,343. The owners' income from our assumed area of 50,000 acres, with its 5-year average of crop yields, is below this 1931 tax requirement only when based upon 1932 prices.

Production in 1931. - Yields were above average for sugar beets and potatoes, and below for other crops. Considering the cropped area of 50,000 acres, but substituting the actual beet acreage (13,172) for the assumed area (16,500), and distributing the difference (3,328 acres) to other crops pro rata; and basing computations upon actual yields and prices for 1931; the landlords' income comes to $368,943. This exceeds the tax requirements for that year.

Production in 1932. - Again considering actual yields and prices for the year, and using the total area of 47,151 acres to which water was delivered, in which the actual beet area of 14,005 acres is included and the balance divided among the other crops proportionately, the landlords' share is $267,448.

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[1] One-fourth of sugar beets and potatoes, one-half of alfalfa after deducting cost of seed, and one-third of all other crops.

Cost of alfalfa seed is the Kansas City wholesale price, 12 pounds per acre, prorated over a period of 5 years, resulting in the following deduction per acre, per annum:

1923 - $0.40	1927 - $0.39	1930 - $0.52
1924 - .44	1928 - .48	1931 - .49
1925 - .44	1929 - .57	1932 - .35
1926 - .40		

This is below the 1931 tax requirements, but probably slightly above those for 1932. That is, the 1932 irrigation levy is $175,489.73, which deducted from $267,448 leaves $91,958, which is more than the 1931 general tax levy. Valuations for 1932 were substantially reduced, but many rates of levy increased. It is likely that the 1932 general taxes for the District lands are below those for 1931.

The Example of a Section of $50 Land

Consider a section of land, valued for District assessment purposes at $50 per acre. (More than half of the District area is so valued.) Assume that 10 per cent is in buildings, roads, ditches, right of ways, corrals, and such uses, and that the remaining 90 per cent is in cultivation, one-third in sugar beets and the balance in other crops in the ratio given heretofore in this report, and assume also that the entire section is being farmed by tenants. The owners' income, with the average 5-year yields of crops given heretofore, and according to price levels prevailing in 1932, 1931, and 1930, appears in Table 18.

At $50 per acre, the 50-mill bond levy amounts to $1,600, and the maintenance and operation toll of $1.25 per acre is $800 for the section. When payments to the United States are resumed at the expiration of existing moratoriums, the 11-mill levy for that purpose will amount to $352. The total of these requirements is $2,752.

Table 19 gives the owners' income as shown in Table 18, together with adjustments for the several groups of beet yields (but with average yields of other crops in all cases), and the owners' income after making deductions for District tax requirements.

Price level 1932. - If the lands of the section under consideration are subject to general taxes averaging $1 per acre, or $640, then production of sugar beets at the rate of 11.36 tons per acre under 1932 prices of farm crops would have covered the tax requirements exclusive of the United States Contract levy, which of course was not made in 1932. Had such levy been made, only lands in the two highest producing groups could have paid all taxes.

Lands subject to $1.50 per acre general taxes, or $960, and producing at the average 5-year rate for all beet lands (12.57 tons), could barely have paid the 1932 levy. With the United States Contract levy included, only lands in the highest producing class could have paid all taxes.

Lands subject to $2 taxes, or $1,280, would have been required to produce at the highest rate to meet the levy, and could not have met it at even that rate had the United States Contract levy been made.

In other words, in the example selected, the farms must have produced more than the average of sugar beets to meet the average tax requirements for all purposes for 1932, in which year they had the benefit of a moratorium on payments due the United States. Lands in our section with general taxes above the average, but with less than average beet production, failed to earn sufficient income to meet the 1932 tax requirements.

TABLE 18. Calculated owners' income from 640 acres of land valued for District assessment purposes at $50 per acre, farmed by tenants, with average yields, and according to price levels of 1932, 1931, and 1930.

Crop	Per cent of cropped area	Area, acres	Income, 1932 price level			Income, 1931 price level			Income, 1930 price level		
			Gross per acre	Owners' share		Gross, per acre	Owners' share		Gross, per acre	Owners' share	
				Per acre	Total		Per acre	Total		Per acre	Total
Sugar beets	33	190	$50.30	$12.58	$2,390	$69.16	$17.29	$3,285	$88.02	$22.00	$4,180
Alfalfa	18	104	8.95	4.13	430	9.84	4.43	461	11.64	5.30	551
Barley	18	104	4.20	1.40	146	9.10	3.03	315	12.25	4.08	424
Corn	16	92	3.80	1.27	117	8.20	2.73	251	10.00	3.33	306
Potatoes	6	34	21.90	5.48	186	24.82	6.20	211	68.62	17.16	583
Oats	5	29	4.29	1.43	41	8.25	2.75	80	8.25	2.75	80
Miscellaneous	4	23	8.40	2.80	64	11.08	3.69	85	18.73	6.24	144
Buildings, etc.	-	64	-	-	-	-	-	-	-	-	-
Total	100	640	-	-	$3,374	-	-	$4,688	-	-	$6,268

TABLE 19. Owners' income from Table 18, with adjustments for different yields of sugar beets, but with average yields of other crops, and after deducting $2,400 for District bonds and maintenance and operation, and $2,752 for District bonds, maintenance and operation, and United States Contract.

Group	Average beet yield, tons per acre	Owners' income, 1932			Owners' income, 1931			Owners' income, 1930		
		Original	After deducting-		Original	After deducting-		Original	After deducting-	
			$2,400	$2,752		$2,400	$2,752		$2,400	$2,752
Average Yield	12.57	$3,374	$ 974	$ 622	$4,688	$2,288	$1,936	$6,268	$3,868	$3,516
Group: 1	9.20	2,732	332	- 20	3,806	1,406	1,054	5,147	2,747	2,395
2	11.36	3,142	742	390	4,371	1,971	1,619	5,865	3,465	3,113
3	13.55	3,558	1,158	806	4,943	2,543	2,191	6,593	4,193	3,841
4	15.77	3,982	1,582	1,230	5,524	3,124	2,772	7,332	4,932	4,580

It so happens that average beet yields from lands in the $50 assessment class for the 5-year period ending with 1932 were 12.83 tons per acre, which is only slightly above the average of all lands in the District; and the range of production in the $50 class was 6.39 to 18.27 tons per acre. It appears, therefore, that not only a large part -- probably nearly half-- of the $50 lands have been below average in production, but that some have been far below average. This lower half had sufficient income according to 1932 price levels to cover 1932 tax requirements only where general taxes were correspondingly low.

Price levels 1931 and 1930. - It appears that with 1931 prices in effect, owners' returns with an average beet production of 9.20 tons per acre (the lowest group average) would be sufficient to cover (in addition to District taxes) general taxes of $1 or $1.50 per acre, and with 11.36 tons production, general taxes of $2 per acre.

It appears, furthermore, that a return to 1930 prices would enable most of the beet areas to cover all presently visible tax requirements, in whatever part of the District the farms might be located.

The Farm Mortgage Situation

As indicated in detail in the chapter on "Individual Indebtedness," mortgages aggregating approximately $1,074,000 are outstanding against District lands, exclusive of some $346,000 of blanket mortgages, -- a total of about $1,420,000. It is also shown that some $295,000 of first mortgages are overdue, and that about $545,000 additional mature in the four years beginning with the year 1933. The annual interest burden on account of the $1,420,000 of mortgages is about $87,500. Two-thirds of the mortgaged land is in the $50 assessment class, and nearly half of that class is so encumbered.

The extent to which landowners may have paid mortgage interest while letting taxes go delinquent was not revealed, but it is quite possible that some may have done so. The threat of immediate mortgage foreclosure is one thing, and a future delinquent-tax sale is another. Fixed charges on account of mortgages may explain some of the delinquencies.

Heavy mortgage indebtedness frequently complicates district bond adjustments. It is true that a tax sale wipes out an existing mortgage against the land sold, but it is equally true that the mortgage remains a charge against farm income so long as it is outstanding. Unless the mortgagees foreclose and become themselves the landowners, or unless the lands are sold for taxes, these mortgage charges will continue to be a serious problem.

The section of $50 land. - Suppose that the 640 acres discussed under the preceding heading is mortgaged at $50 per acre. (First mortgages average $55 per acre.) The annual interest at 6 per cent is $1,920. If general taxes are $1.50 per acre, nothing short of a return to 1930 prices will suffice to cover all tax and mortgage requirements, even though the land be in the highest beet-producing group. Note in this connection that nearly half of the $50 land is mortgaged.

State and Federal Farm Relief Acts. - The situation as regards farm mortgage burdens may be relieved temporarily, if not permanently, by application of the provisions of the bill enacted by the State Legislature and signed by the Governor March 2, 1933, by which a two-year moratorium on farm mortgage foreclosure actions was made possible, and by the later enactment by the Federal Congress of the Rural Credits law, by which various opportunities for relief from present mortgage burdens were made available to farmers. Both enactments are of such recent passage that the effectiveness of their operation has not been demonstrated. So far as permanent relief is concerned, a troublesome handicap affects mortgagors in Farmers' Irrigation District by reason of the present bond defaults. While some measure of relief to mortgagors is perhaps not impossible at present by the operation of the State's Moratorium Act, the full benefits of the Federal Act can not be expected until the District's credit is reestablished, since the bonds are, in effect, a lien against the lands prior to the mortgages.

Accumulated Delinquencies

Two-thirds of the 1931 District levy was delinquent at the beginning of the present year, in addition to substantial fractions of earlier levies. The 1932 levy had not become delinquent when the present field investigation was made. These past delinquencies must be met principally out of future earnings; and a continuation of 1932 prices or even a return to 1931 prices will not permit their being cleared up.

Reasons for the Delinquencies

It has been shown elsewhere (p. 78) that even the heavily reduced returns from farming in recent years, especially 1932, have nevertheless represented a revenue which, in total, has not been substantially below the requirements of District assessments, general taxes, and mortgage interest. Several reasons serve to explain the District's inability to make a more nearly complete collection of its assessments:

(1) The District is composed, not of one farm, but of several hundred farms, and each landowner pays his assessments or fails to pay them for reasons peculiar to himself. Assessment and general-tax valuations differ; crop distribution and crop yields vary; some farms are mortgaged and others are not; some tenant farmers are better than others, and the management of all owner-operated farms is not the same. Consequently, in a given year the assessments against certain tracts will be more than covered by farm income, while those against other tracts will not be covered and will go delinquent. The District levy for 1932 was not increased by reason of the delinquencies for 1931; and indeed, it is hard to see how a 67 per cent increase in the bond levy could have helped matters greatly.

(2) The considerably lighter burden of the neighboring units of the North Platte project has had an unfortunate psychological effect upon the landowners in Farmers' District. For instance, in Pathfinder Irrigation District, only lands in Classes 1 to 4 are assessed for construction, and the annual assessment is based on 5 per cent of the 10-year

average of the gross annual income for the different classes; but even this liberal arrangement has been eased in recent years. Profits from the project-owned power plants are applied to reduce the construction charge, and because of these and other credits no construction assessment whatever was collected from the landowners for 1930, 1931, or 1932. The only charge during those seasons was that for operation and maintenance; and for 1933, this was reduced from the $1.50 per acre previously collected, to $1.10 -- less even than the present tolls of Farmers' District. Thus, while the latter's total assessments have certainly not been excessive when compared with charges made elsewhere, they have seemed so in comparison with those collected from farmers on the immediately adjacent Government developments and undoubtedly have produced a resentment, naturally to be expected though not therefore to be excused, among landowners in Farmers' District.

Flexible versus Fixed Charges

Attention is called to plans of repayment based upon actual farm income that are now under discussion in connection with the refinancing of several Western districts, and with prospects of adoption. The amount of annual payments upon indebtedness - both principal and interest - would be determined in and for each year in view of agricultural production and prices prevailing in the district for that year, with proper allowances for cost of production, family living requirements, and necessary operation and maintenance expenditures. In one case where approximately 80 per cent of the land is farmed by tenants and the crop-share system prevails, it is proposed to arrive at the landlord's share as the basis, after deducting general taxes and district operation costs. In another, where there is little tenantry, costs of production as now determined are to be corrected for each succeeding year in accordance with index figures for farm labor and materials. One plan proposes that the amount of benefits as now assessed shall measure the maximum annual payment and that the deficit due to low returns in any year shall be forgiven. Another proposes annual payments up to a fixed maximum, the deficits, if any, to be carried over to the end of the amortization period and then either refunded or otherwise disposed of as may be agreed upon in the light of circumstances existing at that time.

Flexible repayment plans are not so simple as those carrying fixed annual payments, but they have the virtue of not demanding the impossible. When prices return to those prevailing when the original loan was made - provided, of course, the enterprise was then on a sound basis - payment in full will be resumed. In the meantime delinquencies and defaults, with their disastrous consequences, are not accumulating.

LAND CLASSIFICATION

At the invitation of the District and the Bondholders' Committee, a survey independent of the work of the Bureau of Agricultural Engineering was made by the following members of the staff of the University of Nebraska, assisted by F. A. Hayes, of the Bureau of Chemistry and Soils, United States Department of Agriculture: J. G. Russel, of the Nebraska Agricultural Experiment Station, C. L. Dow, of the Department of Geography, and Dr. G. E. Condra, Dean of the Conservation and Survey Division, who organized the party. The results of the survey are represented by the map appearing in Figure 3, and by the discussion which follows this paragraph. The original map, which is in the files of the District, carries certain details which could not be reproduced here, but which should be useful in explaining certain land classifications. References to these were made in the original discussion, but are omitted below in order that the discussion may apply strictly to the map as reproduced.

Detailed information on the geology, topography, ground water and soils of the area had previously been obtained through surveys conducted by the Conservation and Survey Division, and studies on alkali, crop relationships and the fertilizer requirements of the soils had been made by the Agricultural Experiment Station. The results of the previous field work on this particular project were available for use in determining the classes of land in the District as shown on the map, (Fig. 3).

Topography

Practically all of the land in this District is terrace or bench land. The older and higher terraces have been greatly modified by erosion, their remnants occurring only as gravel-topped hills and ridges of various heights. The least modified terraces are in the central part of the project, occupying most of the land between Tub Springs Creek and the Perrin Railroad Spur (3½ miles east of Bayard). Here the surface is smooth and gently sloping except where crossed by drainage ways or where modified by small, shallow depressions.

In the eastern part of the District and especially east of Red Willow Creek, the terraces have been so severely eroded by wind and water that the greater part of the land slopes rather steeply, making irrigation, except locally, extremely difficult and in many places impossible.

In the western part of the District, i.e., west of Tub Springs Creek, most of the terrace land is smooth, but much of it is too sandy and unstable for profitable irrigation. In many places its irrigability is further reduced by low wind-formed mounds and ridges.

There is comparatively little of the Platte Valley flood plain in this District. However, there are narrow strips of bottomland and of low terraces along the drainage ways crossing the District.

Drainage

Surface drainage, except locally, is adequate throughout the District but the underdrainage in many places is excessive. Rapid downward water loss occurs in most of the sandy land west of Tub Springs Creek, over large areas of similar land east of Willow Creek and in small scattered bodies and narrow strips where gravel is at or near the surface of the ground.

The most favorable drainage conditions are in the large area between Tub Springs and Willow Creeks where most of the land has good but not excessive surface and under drainage. The only poorly drained land is on the Platte River flood plain near the head of the canal, in the bottomlands along a few of the creeks flowing from the north, and in shallow basins or depressions on the more nearly level-lying terraces. A part of the poorly drained land has become rather alkaline.

Soils

The soils of the District vary widely. The oldest and best developed soils are the most productive. They have weathered from fine-textured terrace materials consisting largely of silts and very fine sands and occur only on the less eroded terraces where conditions have been most favorable for prolonged weathering and the accumulation of organic matter. These soils are classed in the State and Federal soil surveys as Tripp silt loam and Tripp very fine sandy loam. They are developed on all of the smoother and better drained terraces throughout the North Platte Valley and in this District occupy most of the area between Willow and Tub Springs Creeks. They have thick, dark colored top soils, fine-textured, coherent subsoils and are highly rententive of moisture. Both are adapted to all crops common to the region and they are regarded as the most productive general farming soils in Western Nebraska. Practically all of the area occupied by them is suited to irrigation.

In contrast to the Tripp silt loam and Tripp very fine sandy loam formed under conditions most favorable for deep soil development are extensive areas of extremely sandy soils with low lime content such as Valentine sand and loamy sand; large areas of Bridgeport soils including several types all with thin, light colored and usually unstable top soils; and numerous bodies of Tripp gravelly sandy loam which is composed largely of coarse gravel. In addition there are many small bodies of poorly drained soil, some of which is rather alkaline, and small developments of rough, broken land occupied chiefly by the shallow and stony Canyon soil. None of these soils is as productive as the Tripp silt loam or the Tripp very fine sandy loam, and some of them are unsuited or poorly adapted to irrigation. They occur chiefly in the eastern and western parts of the project, namely east of Red Willow Creek and west of Tub Springs Creek.

The soils of the District differ not only in their features but also in their crop adaptations and producing powers. These differences in the absence of irrigation remain constant and are the bases for separating the soils in detail soil mapping. However, when the soils are subject to irrigation some of them undergo profound changes both in features and crop

adaptations. The changes may be the direct result of water applications as is often the case in basin-like depressions and low lying areas where under dry farming methods the soils are usually the most productive but under irrigation may become so saturated, alkaline and puddled as to be worthless for cultivated crops. Likewise, changes in the soils may result indirectly from irrigation as is the case in most of the Valentine soils and the more sandy types of the Bridgeport soils. These soils, which are very unstable except where protected by grass cover, are used under dry farming methods chiefly for pasture and hay land. When used in this way they are able to accumulate a little organic matter from the decaying grass roots and to maintain thin though fairly dark colored top soils. Under irrigation accompanied by the destruction of native grasses through cultivation, the Valentine and Bridgeport soils rapidly become areas of wind-blown hummocky sand of little value either for irrigated crops or dry land pasture. Typical examples of these and many other changes brought about in the soils and in soil and crop relationships by irrigation occur in the eastern and western parts of the area with which this report is concerned. A few of the changes, especially those of rather local nature, have occurred subsequent to the time the State and Federal soil surveys were completed, and these surveys will necessarily need local revision.

Land Classes

The classification involved five major groups, instead of the 10 represented in the District's assessment plan as depicted on the companion map in Figure 3.[1/] The plan used in the land classification is similar to that followed, for assessment purposes, in the adjacent units of the North Platte project. The acreage given below in each of the five classes, and the total acreage, agree with the original map. However, the latter covers more land than the District includes. Such of this excess as is outside the exterior boundaries of the District has been eliminated in the reproduced map (Fig. 3). Lands within the exterior boundaries fall into two general classes: (1) Lands irrigated from the canal but having preferred water rights and never legally within the District; (2) Lands which, due to natural causes, are not subject to irrigation from the canal of the District and, therefore, not a part of the corporate entity. These exclusions have been taken into account in the parenthetical notes following the description of each class, and in the concluding tabulation (Table 20).

On the original map, the five major classifications are further divided, letters being used to designate the outstanding defect in the soil of a class. For example, an area represented by 3 U is Class 3 with unstable soil shown by the letter U. Likewise, an area designated as 2 S is Class 2, with unfavorably steep slope S.

The soils may have defects aside from those indicated by the letters used. For instance, an unstable soil is usually so coarse textured as to be droughty. It may be deficient in organic matter and phosphorus and it

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1/ Attention is directed to the approximate harmony between Class 1 lands in both maps, and between Class 2 on the land classification map and Classes 2 and 3 on the assessment map.

may be inaccessible or unfavorably located, but to indicate these defects by letter symbols would be more or less confusing. Consequently, only the outstanding defects are indicated on the original map, and it has not been possible to reproduce even these in Fig. 3. The original map should be referred to where questions relating to specific assessments are involved.

Class 1. - This land is smooth and gently sloping. It has good, but not excessive surface and under drainage, and can be irrigated at a minimum cost. The soils have dark colored surface layers which are moderately well supplied with organic matter. Both soil and subsoil are friable throughout and have high moisture retaining powers. The soils are well supplied with lime, especially in their subsoils, but do not contain injurious amounts of alkali. The soil material is sufficiently fine in texture to prevent excessive wind erosion even during periods of dry, windy weather. This land is made up chiefly of the fine-textured types of the Tripp soils. It is the best general farming land in the North Platte Valley and produces, under irrigation, high yields of all crops common to the region. Most of the sugar beets and alfalfa are grown on it. The class occupies about 33,207 acres or 40.3 per cent of the area surveyed (29,222 acres, or approximately 47 per cent, of the actual area of the District).

Class 2. - This land is smooth to gently rolling. In most respects it resembles the land of Class 1. The top soils are moderately dark and the subsoils are friable, retentive of moisture and well supplied with lime. However, the land, as a rule, is less even and more subject to wind erosion than that of Class 1. In places, it is poorly drained and it may contain alkali or be deficient in phosphorus or organic matter. It produces good yields, under irrigation, of all crops common to the region, but requires more careful management than Class 1 land. The finer textured types of the Bridgeport soils and the moderately sandy types of the Tripp soils constitute most of this class. The class includes about 13,452 acres or 16.2 per cent of the area surveyed (9,047 acres, or approximately 14 per cent, of the actual area of the District).

Class 3. - This land is undulating to strongly rolling. The soils as a rule are sandy and deficient in lime, phosphorus, and organic matter. Most of them have low water-retaining powers and are unstable. This class of land is occupied chiefly by sandy types of the Tripp and Bridgeport soils. Nearly all of it has at one time or another, been irrigated, but much of the irrigated land has since been abandoned or is used only for pasture, hay or dry farming. This land is of doubtful value for irrigation and could well be eliminated if water is scarce. It occupies about 15,349 acres or 18.6 per cent of the area surveyed (10,882 acres, or 17 per cent, of the actual area of the District.)

Class 4. - This class includes marshes and areas which are too wet or alkaline for cultivated crops. Most of the soils are fine-textured and well supplied with organic matter, especially in their surface layers; but under present conditions are suited only for grazing land and wild hay production. Much of this land could be reclaimed. Under adequate drainage the marshy areas would become valuable for tame hay, grain and beets. Even

the alkaline areas could, in most instances, be made productive if drained and supplied with phosphorus. The class occupies about 3,812 acres or 4.6 per cent of the area surveyed (2,380 acres, or 4 per cent, of the actual area of the District).

Class 5. - This class includes rough land, dune sand and areas of sandy or gravelly land, such as the Valentine soils and the extremely sandy and gravelly types of the Tripp and Bridgeport soils. All of it is either too elevated, droughty, or unstable for profitable farming under irrigation, or is too remote for feasible watering. Most of this land is of value only for pasture or wild hay. However, small areas under favorable conditions are used for dry-land farming. This class occupies about 16,774 acres or 20.3 per cent of the area surveyed. (10,943 acres, or 18 per cent, of the actual area of the District.)

Acreages and proportions enumerated above are summarized in Table 20.

TABLE 20. Classification of Lands in Farmers' Irrigation District.

Class	Acreage represented in land survey	Acreage actually in District	Proportion of total area of District
	Acres	Acres	Per cent
1	33,207	29,222	47
2	13,452	9,047	14
3	15,349	10,882	17
4	3,812	2,380	4
5	16,774	10,943	18
Total	82,594	62,474	100

SUMMARY

Farmers' Irrigation District contains an assessed area of 62,473.6 acres in Scotts Bluff and Morrill Counties, Nebraska, of which 47,151 acres were served with water in 1932. This irrigated area is less than normal, due to the imposition of new restrictions upon delivery to delinquent lands. In addition to the assessed lands, about 3,000 acres of lands holding preferred water rights received water from the canal.

The District has excellent water rights on North Platte River, consisting of a natural-flow right of early priority and a Warren Act contract with the United States involving storage in Pathfinder Reservoir. The District is under contract to carry water to Northport Irrigation District, and in addition has a number of cooperative drainage contracts with neighboring units.

The condition of the main farmers Canal, generally speaking, is good, but is such as to require constant attention to keep it in safe operating condition. The management apparently is well aware of the problems involved and is taking every means of preserving the system which it considers practicable. The most serious problem of canal maintenance is in dealing with cross drainage. An expenditure of about $61,500 is needed to care for cross drains, and about $15,975 additional on the drain diversions.

Farmers' District has $2,000,000 of 6 per cent bonds outstanding as the result of a partly refunding and partly new issue in 1926, in addition to $18,900 of 6 per cent bonds left from the original issue of 1913, and $15,500 of 5 per cent drainage bonds.

Bond principal (original issue) due in 1932 and not paid totaled $11,700; bond interest, including that due January 1, 1933, approximately $85,729. There were no defaults in 1931.

Contractual indebtedness to the United States is indicated by the District audit as $306,714.66. The exact amount is subject to some revision, depending upon the outcome of a pending adjustment.

Warrants outstanding at the end of 1932 amounted to $80,312.

Delinquencies in payment of District assessments at the end of 1932 aggregated $511,076 for the years 1913-1931, inclusive, and the 1932 assessment then unpaid but not yet delinquent was $174,044; thus making total outstanding District taxes $685,120. Tax certificates on about 5,587 acres in the principal amount of $207,493 are held by the District. Delinquencies in payment of general taxes against lands in Farmers' District for the years ending with 1931 are $96,580.

Lands in Farmers' District, in common with other lands in the two counties, are subject to $2,065,630 of school district and other public bonds other than those of the District.

First mortgages totaling $1,265,605 are outstanding against 23,077 acres of District lands. Second and third mortgages amount to $59,311.

Lands are classified for assessment purposes according to valuations ranging from $50 down to $1 per acre. The $50 class includes 53 per cent of the total acreage and 69 per cent of the total valuation. Lands of the $50, $45, and $40 classes together include 74 per cent of the acreage and 92 per cent of the valuation. Of land under mortgage, two-thirds is in the $50 class; and nearly half of that class is so mortgaged.

The classification of lands made in connection with the present investigation is in close harmony with the assessment classification. For instance, Class One lands are generally those of the $50 assessment class, and Class Two lands, $45 and $40 classes.

Amortization of bonds and indebtedness to the United States requires an average levy (based upon 62,500 acres) of $2.40 per acre in the majority of years, with a range of $3.12 per acre for $50 land down to $0.06 per acre for $1 land. Corresponding figures for the lowest annual payment (1933) are $2.00, $2.60, and $0.05; for the highest years (1943 to 1945), $2.80, $3.64, and $0.07.

The District toll charge for water in 1933 is $1.25 per acre.

General taxes in 1931 averaged $1.33 per acre. In 1932, lands valued at $55 per acre (representative of the better grades) exclusive of improvements, would pay $0.78 to $2.11 per acre, depending upon the county and school district in which located; and those valued at $65 per acre, which were not numerous, would pay $0.92 to $2.49.

Farm tenantry predominates. Only 22 per cent of the farms in the District are operated by their owners, and the irrigated acreage in these farms is only 20 per cent of the total irrigated acreage. Many of the farms are owned by non-resident individuals or corporations. The type of lease in practically universal use provides for a division of the crops between tenant and owner; the owner paying the taxes and irrigation assessments and tolls, and taking one-fourth (until recently one-fifth) of the sugar beets, one-half of the alfalfa hay (paying himself for the seed), one-fourth of the potatoes, and one-third of all other crops.

The principal crop is sugar beets, consisting of about one-third of the farmed area. Alfalfa and barley constitute about 18 per cent each, corn 16 per cent, potatoes 6, oats 5, and miscellaneous crops the balance or 4 per cent. The agriculture of the District for many years has been founded on the sugar beet, which is the cash crop that has carried the farmers through the years of low prices for agricultural products. Annual yields of sugar beets for the District averaged 12.57 tons per acre for the five-year period 1928-1932; the lowest annual average being 10.71 tons in 1929 and the highest 14.05 in 1931.

Beet by-products, combined with feed crops, form the basis of a well-balanced feeding industry which supplements the crop program. The feeding of lambs is holding its own, despite low prices, while cattle

feeding has fallen off because of heavy losses suffered by feeders in recent seasons. Some hogs are fed. While profits from feeding are hoped for, its principal purpose is to provide fertilizer for the beet fields.

With the exception of a few areas, the entire District is adapted to sugar beets, but necessities of soil management and nematode control enforce crop rotations which have the effect of keeping the area in beets at or below one-third the total area.

Prices paid the farmers for beets during the last ten years have ranged from $8.18 per ton to (average) $4 per ton, the latter figure being the 1932 price. Substantial reductions have been made in the cost of raising beets, and even the present low price has permitted farmers to make profits from their beets where good yields were obtained. This has been notably the case where exceptional circumstances permitted more than the average proportionate acreage to be devoted to beets. In many cases, however, these profits have been more than offset by losses from other crops or from feeding operations. Further reductions in costs of raising beets may be possible, but they will not be substantial.

Whether or not they represented profits, the returns from farming have suffered a precipitate decline during the last three years. When charted, the downward course of prices for farm products is harmonious with the decline in the purchasing power of the farmer's dollar and the payment of District assessments.

The very high proportion of tenantry in the District makes appropriate a computation of farm income expressed as the landlord's share, which obviates the necessity of determining costs of production and requirements for farm family living. The landlord's share is the landowner's net income available for the payment of fixed charges against the land.

Total gross income of the farmers has ranged from approximately $2,425,000 in 1926 to approximately $1,072,000 in 1932. The share of the landlords has ranged from approximately $650,000 to $290,000.

On the basis of a typical example, the farms must have produced more than the average yield of sugar beets to meet the average tax requirements for all purposes in 1932, in which year no payments were required of the District by the United States. Lands with general taxes above the average, but which produced less than the average yield of beets, failed to earn the 1932 tax requirements.

A return to 1930 prices would enable most of the beet areas to cover all presently visible tax requirements. Nothing short of such a return will suffice to cover all tax and farm mortgage requirements, even in the case of land producing the highest beet yields.

Farm mortgage burdens may be relieved temporarily by recently-enacted State and Federal laws, but permanent relief will probably have to await the reestablishment of the District's credit.

The District's inability to make a more complete collection of its assessments is attributable to the facts that it is composed of a great many farms, the paying ability of each of which is peculiar to itself: Assessments and valuations differ, crop distribution and yields differ; some farms are mortgaged and others not; some tenant farmers are better than others; the management of owner-operated farms is not uniformly efficient. In addition to these facts, a resentment exists because of the substantially lighter assessment obligations of neighboring farmers on units of the North Platte project.

CONCLUSIONS

The financial set-up effected in 1926, under which the District is now operating, was justified by farm prices and returns then current; and had the latter continued no default need have been made. A return to the approximate 1926 levels would permit retention of the present financial basis. A return to approximate 1930 levels would permit such retention except for accumulated delinquencies. Present bond obligations can not be met by present farm returns.

No large error appears to have been made in the assessment valuation plan. Certain revisions are justified in some sections, but they would have no substantial effect upon the total assessment collections, unless a large area of the poorer lands in the eastern end of the District could be eliminated. Such an elimination would permit a considerable saving in the operation expenses of the District and if practicable is to be recommended; but its accomplishment would involve a termination of the contract with Northport District and possibly a sacrifice of water rights.

The District management appears to be efficient and economical. A possible danger lies in carrying economies too far.

Two courses may be followed in the readjustment of present bond obligations: (1) A moratorium may be arranged to run (a) until farm prices return to the averages of 1930; (b) until they reach the level of 1926; or (c) until they reach apparent stability at some other average. If the first-mentioned course is followed, it will have to be accompanied with some settlement of accumulated assessment and tax delinquencies. If the last-mentioned course is followed, an entirely new arrangement of interest and principal maturities will have to be made, provided the principal amount of the present bonds is retained; or a reduction of the latter will have to be agreed upon.

(2) The present set-up may be retained, except that for present annual requirements, a plan of flexible assessments shall be substituted, this to move from year to year in accordance with the course of farm prices generally or those for sugar beets in particular.

A P P E N D I X

APPENDIX A - Court cases referred to in text.

1 - Farmers Canal Company et al. v. William Frank et al., 72 Neb. 136, 100 N.W. 286. (June 9, 1904.)

2 - Clague et al. v. Tri-State Land Company, 84 Neb. 499, 121 N.W. 570. (May 21, 1909.)

3 - Lincoln Land Company v. Tri-State Land Company, Circuit Court of United States, District of Nebraska, North Platte Division, Doc. A, No. 14. (July 19, 1909.)

4 - Minor v. Tri-State Land Company, Circuit Court of United States, District of Nebraska, North Platte Division, Doc. A, No. 14. (July 19, 1909.)

5 - Morrill v. Tri-State Land Company, Circuit Court of United States, District of Nebraska, North Platte Division, Doc. A, No. 14. (July 19, 1909.)

6 - Fenton v. Tri-State Land Company et al., 89 Neb. 479, 131 N.W. 1038. (Opinion June 13, 1911; decree August 11, 1911.)

7 - Enterprise Irrigation District et al. v. Tri-State Land Company et al., 92 Neb. 121, 138 N.W. 171. (October 18, 1912.)

8 - Enterprise Irrigation District et al. v. Farmers Mutual Canal Company et al., 243 U.S. 157, 37 Sup. Ct. Rep. 318. (March 6, 1917.)

9 - New York Trust Company et al. v. Farmers' Irrigation District, 280 Fed. 785. (April 14, 1922.)

10 - Morrill v. Farmers' Irrigation District, - District Court of Scotts Bluff County, Nebraska, Civil, 4932. (Decree June 15, 1929.)

11 - Farmers' Irrigation District v. City of Bayard, - District Court of Morrill County, Nebraska, Appearance Docket No. 9, p. 81. (Case ready for trial on the issues.)

12 - State of Nebraska ex rel. C. A. Sorensen, Attorney General, v. Mitchell Irrigation District, - District Court of Scotts Bluff County, Nebraska, Civil, 6075. (Latest pleading filed September 9, 1932.)

13 - Northport Irrigation District v. Farmers' Irrigation District et al.,- District Court of Scotts Bluff County, Nebraska, Civil, 6406. (Notice of appeal filed February 7, 1933.)

14 - Mitchell Drainage District v. Farmers' Irrigation District, - District Court of Scotts Bluff County, Nebraska, Civil, 6468. (Cost bond filed for appeal to Supreme Court.)

APPENDIX B - Scheduled repayments of indebtedness, Farmers' Irrigation District, 1932 to end of bond amortization period

Year	Bond maturities	Bond interest	United States contract	All annual repayments	
				Total	Average per acre
1932	$ 13,700 *	$ 121,588	- ***	$ 135,288	$ 2.17
1933	6,700 *	120,976	- ***	127,676	2.04
1934	-	120,775	$ 28,500	149,275	2.39
1935	8,000	120,535	28,500	157,035	2.51
1936	8,500	120,040	28,500	157,040	2.51
1937	3,000	119,695	28,500	151,195	2.42
1938	15,500**	119,218	28,500	163,218	2.61
1939	10,000	118,530	28,500	157,030	2,51
1940	10,500	117,915	28,500	156,915	2.51
1941	11,500	117,255	28,500	157,255	2.52
1942	20,000	116,310	22,468	158,778	2.54
1943	21,000	115,080	38,760 ***	174,840	2.80
1944	22,000	113,790	38,760 ***	174,550	2.79
1945	23,000	112,440	38,760 ***	174,200	2.79
1946	25,000	111,000		136,000	2.18
1947	26,000	109,470		135,470	2.17
1948	28,000	107,850		135,850	2.17
1949	29,000	106,140		135,140	2.16
1950	31,000	104,340		135,340	2.17
1951	33,000	102,420		135,420	2.17
1952	35,000	100,380		135,380	2.17
1953	39,500	98,145		137,645	2.20
1954	54,000	95,340		149,340	2.39
1955	57,500	91,995		149,495	2.39
1956	61,000	88,440		149,440	2.39
1957	64,500	84,675		149,175	2.39
1958	68,000	80,700		148,700	2.38
1959	72,500	76,485		148,985	2.38
1960	76,500	72,015		148,515	2.38
1961	81,000	67,290		148,290	2.37
1962	86,000	62,280		148,280	2.37
1963	91,500	56,955		148,455	2.38
1964	97,000	51,300		148,300	2.37
1965	102,500	45,315		147,815	2.37
1966	108,500	38,985		147,485	2.36
1967	115,000	32,280		147,280	2.36
1968	122,000	25,170		147,170	2.35
1969	129,500	17,625		147,125	2.35
1970	137,000	9,630		146,630	2.35
1971	92,000	2,760		94,760	1.52

* Original issue.

** Red Willow drainage bonds.

*** Installments due 1931, 1932, and 1933 postponed by moratorium to end of contract period, which ends in 1942; interest payable same time as deferred principal. Payments shown for 1943, 1944, and 1945 are the three deferred payments plus accrued interest - on assumption that they will be ordered paid in three installments.

APPENDIX C. - Tax Levies, Farmers' Irrigation District, and Outstanding Taxes as of December 31, 1932.

Levy	General Fund		Special Bond Fund		Bond Fund		U. S. Contract Fund	
	Levied	Unpaid	Levied	Unpaid	Levied	Unpaid	Levied	Unpaid
1913	$60,985.46	$ 1,171.19	$185,607.92	$ 3,564.48				
1914	48,653.12	993.16	170,285.91	3,476.07				
1915	104,668.55	1,657.71	130,356.90	2,072.14				
1916	105,620.26	2,287.64	145,227.86	3,145.52				
1917	177,680.00	4,639.67	88,840.01	2,319.83				
1918	213.322.20	6,776.28	53,330.55	1,694.06				
1919	251,980.43	11,406.48	66,310.64	3,001.72				
1920	297,465.81	19,659.38	108,169.38	7,148.87				
1921	269,216.50	18,263.26	80,764.95	5,478.98				
1922	156,683.84	10,428.26	104,455.89	6,952.20				
1923	156,167.76	9,629.33	104,111.83	6,419.57				
1924	141,595.40	9,826.55	115,860.78	8,039.88				
1925	126,850.82	7,260.45	126,850.82	7,260.46				
1926	109,647.07	6,577.68	121,830.08	7,308.54			$36,549.02	$ 2,192.58
1927	108,972.59	7,060.00	121,080.65	7,844.47	$7,264.85	$ 470.67	29,059.36	1,882.67
1928	108,771.25	8,502.70	120,856.95	9,447.46	7,251.42	566.85	29,005.67	2,267.38
1929	108,497.06	14,847.43	144,662.73	19,796.57	7,233.12	989.82	28,932.55	3,959.34
1930	108,451.63	30,940.49	120,501.82	34,378.36	7,230.11	2,062.70	28,920.43	8,250.82
1931	108,012.42	72,473.11	120,013.80	80,525.70	9,601.10	6,442.05	26,403.04	17,715.69
*		244,400.77		219,874.88		10,532.09		36,268.48
1932	48,079.38	47,683.18	120,198.45	119,207.92	7,211.90	7,152.50		
**		292,083.95		339,082.80		17,684.59		36,268.48

* Sums in this line are total delinquencies.
** Sums in this line are total outstanding taxes. Levy for 1932 delinquent May 1, 1933.

APPENDIX D. - Measured Acres of Sugar Beets in Areas Tributary to North Platte Valley Factories of Great Western Sugar Company, by Years; Areas Planted to Beets One Year or More; and Ratios of Latter Areas to Former; by Years, 1929 to 1932.

Factory	Measured Area of Beets				Area Continuously in Beets Five Years or More							
					1932		1931		1930		1929	
	1932	1931	1930	1929	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area
	Acres	Acres	Acres	Acres	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent
Scottsbluff	9677	9593	12179	14178	513	5.3	604	6.2	1070	8.9	992	7.0
Gering	11572	11840	11821	13460	103	.9	138	1.2	527	4.4	880	6.5
Bayard	11964	11282	14488	18666	1234	10.3	703	6.2	1895	13.1	2715	14.5
Minatare	10110	9574	11534	13928	351	3.4	1361	14.2	1821	15.8	3878	27.8
Mitchell	6758	6612	8455	9512	326	4.9	289	4.3	392	4.7	592	6.3
Lyman	6311	5262	5827	6328	277	4.2	476	9.6	583	10.0	498	7.9
Totals and Averages	56392	54163	64304	76072	2804	4.9	3571	6.6	6288	9.77	9555	12.56

Factory	Area Continuously in Beets Four Years or More								Area Continuously in Beets Three Years or More							
	1932		1931		1930		1929		1932		1931		1930		1929	
	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area
	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent
Scottsbluff	586	6.1	980	10.3	1199	9.9	1713	12.7	1085	11.2	1865	19.6	2479	20.4	2619	18.4
Gering	292	2.5	694	5.9	1042	8.8	964	7.3	1601	13.8	2306	19.5	2294	19.3	2660	19.8
Bayard	1004	8.5	1539	13.7	1332	9.2	2063	11.0	1282	10.7	2071	18.4	2653	18.3	2907	15.6
Minatare	716	7.1	491	5.2	868	7.5	697	5.0	1362	13.4	1511	15.8	1833	15.9	2377	17.0
Mitchell	289	4.4	379	5.7	418	4.9	408	4.3	569	8.3	934	14.1	1093	12.9	1232	13.0
Lyman	495	7.8	444	8.4	573	9.8	678	10.7	858	13.6	854	16.2	987	16.9	1017	16.1
Totals and Averages	3382	5.9	4527	8.4	5432	8.44	6523	8.56	6757	12.0	9541	17.6	11339	17.63	12812	16.84

APPENDIX D. - Continued.

Factory	Area Continuously in Beets Two Years or More								Area Continuously in Beets One Year or More							
	1932		1931		1930		1929		1932		1931		1930		1929	
	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area	Area	Proportion of measured area
	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent
Scottsbluff	2596	20.7	2269	23.5	3728	30.6	4149	29.2	4898	50.6	3893	40.4	3673	30.1	4655	32.6
Gering	3514	30.4	2876	24.4	3757	31.8	3793	28.1	6062	52.4	5793	49.1	4243	35.9	5133	37.3
Bayard	2602	21.7	2433	21.6	3515	24.2	5070	27.2	5842	48.8	4536	40.1	5093	35.2	5911	31.7
Minatare	2195	21.7	2195	22.9	2817	24.4	2722	19.5	5486	54.3	4016	41.9	4195	36.4	4254	30.5
Mitchell	1609	23.8	1797	27.2	2988	35.3	2158	22.7	3965	58.6	3213	48.7	3564	42.2	5119	53.8
Lyman	1632	25.8	1407	26.7	1395	23.9	1542	24.4	3049	48.3	2081	39.6	2289	39.3	2582	40.8
Totals and Averages	14145	25.1	12977	24.0	18200	28.31	19435	25.55	29302	52.0	23532	43.4	23057	35.85	27654	36.35

APPENDIX E. - Acreages of Specified Crops in Areas Tributary to North Platte Valley Factories of Great Western Sugar Company, and Ratios of Those Acreages to the Estimated Irrigable Acres in Farms Growing Sugar Beets; by Years, 1929 to 1932.

Factory	Alfalfa								Grain and Alfalfa							
	1932		1931		1930		1929		1932		1931		1930		1929	
	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area
	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent
Scottsbluff	6816	21.9	7391	23.5	7807	23.5	6630	24.9	2578	8.3	2169	6.9	3607	10.9	2412	6.9
Gering	8892	22.9	6622	22.8	8053	21.0	7399	23.2	2920	7.6	2635	6.0	3109	9.2	2685	8.4
Bayard	7015	17.8	6360	16.3	7488	17.3	6682	13.3	2322	5.9	1769	4.6	1675	3.9	2392	4.7
Minatare	6594	20.0	6459	21.4	6815	21.4	5605	16.7	2664	8.1	2476	6.2	2369	7.5	1407	4.2
Mitchell	5421	21.9	6408	24.6	7592	25.9	7342	25.5	2675	10.8	2124	8.2	3158	10.7	2763	9.6
Lyman	4645	21.4	3867	19.7	4056	20.3	3479	19.4	1625	7.4	1393	7.1	1995	9.9	150	.8
Totals and Per cent	39383	20.9	39307	21.3	41611	21.87	39137	19.7	14784	7.8	12576	6.8	15911	8.32	11810	5.9

Factory	Sweet Clover								Grain and Sweet Clover							
	1932		1931		1930		1929		1932		1931		1930		1929	
	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area
	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent
Scottsbluff	173	.6	127	.3	599	1.8	784	2.2	1795	5.8	2715	8.6	2290	6.9	1946	5.6
Gering	213	.6	231	.7	333	1.0	529	1.6	2206	5.7	2767	7.2	1742	5.2	1431	4.5
Bayard	202	.5	439	1.2	1026	2.4	1582	3.1	2509	6.4	3191	8.4	2996	6.9	3123	6.0
Minatare	273	.8	322	1.1	326	1.0	652	1.9	1883	5.7	2621	8.7	2512	7.9	1453	4.3
Mitchell	23	.1	226	.9	468	1.6	496	1.7	2091	8.4	2632	10.1	1981	6.8	976	3.4
Lyman	70	.4	32	.1	256	1.3	223	1.8	1041	4.8	968	4.9	495	2.5	462	2.6
Totals and Per cent	954	.5	1377	.6	3010	1.58	4268	2.2	11526	6.2	14894	8.1	12015	6.28	9391	4.7

APPENDIX E. - Continued #2

Factory	Grain								Potatoes							
	1932		1931		1930		1929		1932		1931		1930		1929	
	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area
	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent
Scottsbluff	1829	5.9	1693	5.3	1421	4.3	1982	5.7	2893	9.3	2921	9.3	1628	4.9	1312	3.7
Gering	3290	8.5	3549	9.2	3438	10.2	3465	10.9	3293	8.5	3143	8.1	1351	4.0	961	3.1
Bayard	2941	7.5	3585	9.1	5010	11.5	6256	12.4	1001	2.5	1974	2.9	367	.8	260	.6
Minatare	2263	6.8	2099	6.9	2181	6.9	4174	12.5	1655	5.0	1397	4.6	847	2.7	466	1.4
Mitchell	489	2.0	452	1.6	799	2.7	1432	5.0	4273	17.3	4390	16.9	3914	13.3	3739	13.0
Lyman	1465	6.7	1668	8.5	1618	8.1	2749	15.3	2313	10.6	3964	15.6	1872	9.4	1569	8.7
Totals and Per cent	12277	6.5	12946	7.0	14467	7.6	20060	10.1	15428	8.2	15989	8.8	9979	5.2	8313	4.2

Factory	Beans								Corn							
	1932		1931		1930		1929		1932		1931		1930		1929	
	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area
	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent
Scottsbluff	381	1.2	132	.4	462	1.4	387	1.1	2712	8.7	2397	7.9	1635	4.9	1277	3.7
Gering	906	2.4	1010	2.6	1369	4.4	492	1.5	3746	9.7	3376	8.8	1763	5.2	1349	4.2
Bayard	150	.4	327	.9	542	1.2	442	.9	8350	21.3	6865	17.9	5282	12.2	4676	9.3
Minatare	564	1.7	597	2.0	690	2.2	504	1.5	2958	9.0	2159	7.2	1404	4.4	931	2.9
Mitchell	439	1.8	495	1.9	857	2.9	374	1.3	1979	7.9	1960	7.5	1620	5.5	1352	4.7
Lyman	403	1.8	746	3.8	798	4.0	359	2.0	1522	6.9	1061	5.4	551	2.8	498	2.8
Totals and Per cent	2843	1.5	3307	1.8	4718	2.47	2558	1.3	21267	11.3	17818	9.7	12255	6.47	10083	5.1

APPENDIX E. - Continued #3

Factory	Miscellaneous Crops							
	1932		1931		1930		1929	
	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area	Area	Proportion of irrigable area
	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres	Per cent
Scottsbluff	2237	7.2	2245	7.1	1500	4.5	1702	4.8
Gering	1908	4.9	1262	3.3	514	1.5	119	.3
Bayard	2837	7.3	3718	9.7	4504	10.4	5999	11.7
Minatare	3874	11.8	2436	8.1	3113	9.8	4195	12.6
Mitchell	673	2.8	731	2.9	526	1.8	616	2.1
Lyman	2354	10.8	645	3.3	1750	8.7	1151	6.4
Totals and Per cent	13883	7.4	11037	5.9	11907	6.23	13782	6.9

Factory	1932		1931		1930		1929	
	Est. Irrig. Acres	Actual Cropped Acres	Est. Irrig. Acres	Actual Cropped Acres	Est. Irrig. Acres	Actual Cropped Acres	Est. Irrig. Acres	Actual Cropped Acres
Scottsbluff	31091	31091	31403	31403	33155	33128	34933	34610
Gering	38946	38946	38804	38635	33551	33493	33286	31891
Bayard	39291	39291	38520	38520	43379	43379	50086	50086
Minatare	32838	32838	30140	30140	31791	31791	33295	33315
Mitchell	24821	24821	26010	26010	29370	29370	28987	78604
Lyman	21750	21749	19666	18706	28012	19216	17955	16968
District Totals	188737	188736	184543	183414	191258	190377	198342	195474

APPENDIX F. - Average Per Acre Gross Income, by Crops and Productive Soil Classes, 1932, and Aggregate Per Acre Gross Income, by Soil Classes, 1927 to 1932, Gering and Fort Laramie Irrigation District.

Crop	All Classes	Class 1	Class 2	Class 3	Class 4	Class 5
HAY - Alfalfa	11.16	11.98	10.37	10.05	9.94	4.92
- Miscellaneous	1.40	3.50	1.42	1.77	2.12	-
- Native	3.64	-	4.05	3.27	3.60	-
BEETS - Stock	25.00	25.00	-	-	-	-
- Sugar	59.11	60.26	58.00	55.87	51.02	52.70
- Tops	1.48	1.48	1.48	1.48	1.48	1.48
Beans	14.47	15.65	14.33	11.73	8.63	3.67
Barley	5.80	6.62	5.38	4.64	3.49	3.25
Cane	2.62	1.42	3.50	2.50	5.20	-
CORN - Indian	6.10	7.54	5.48	5.28	4.09	3.36
- Pop	7.38	-	-	7.38	-	-
- Fodder	5.96	4.77	7.78	2.50	2.33	-
Garden	30.00	30.00	30.00	30.00	30.00	30.00
Oats	6.23	6.38	6.84	4.82	4.90	3.80
Onions	25.76	24.28	29.25	60.00	-	-
PASTURE - Miscellaneous ...	4.00	4.00	4.00	4.00	4.00	4.00
- Native	1.00	1.00	1.00	1.00	1.00	1.00
Potatoes	9.09	10.25	8.93	6.17	5.12	7.61
Seed - Alfalfa	3.02	9.60	.57	-	4.80	9.60
Wheat	5.01	5.27	5.08	3.17	5.50	3.30
Watermelons	43.00	41.25	50.00	-	-	-
Cabbage	24.96	25.74	16.00	-	-	-
AGGREGATE AVERAGE -- 1932	22.02	25.83	20.55	14.96	10.27	7.85
-- 1931	29.70	36.11	25.90	19.73	13.14	9.24
-- 1930	44.55	52.70	39.87	29.17	21.31	18.53
-- 1929	47.98	56.37	41.30	33.91	23.06	15.68
-- 1928	34.26	42.27	27.06	19.95	13.83	6.50
-- 1927	33.54	41.18	23.71	21.81	8.70	2.85

APPENDIX G. - Farm Business Records of Selected Irrigated Farms in Scotts Bluff and Morrill Counties, Nebraska, 1929-1931. (Figures in parentheses show number of records.)

Factors Useful in Analyzing the Farm Business	Average, All Farms			Average, Most Profitable Farms			Average, Least Profitable Farms		
	1929 (27)	1930 (29)	1931 (20)	1929 (10)	1930 (10)	1931 (7)	1929 (10)	1930 (10)	1931 (7)
1. Area of farm .....Acres	170	261	176	227	207	112	115	279	246
2. Area in crops .....Acres	129	148	116	153	149	95	98	143	126
3. Proportion of land tilled .....Per cent	75.6	62.8	70.2	67.2	75.9	87.0	84.7	60.7	58.5
4. Gross receipts, per acre .....Dollars	37.40	17.08	13.66	33.37	30.40	29.90	46.35	9.26	6.07
5. Total expenses, per acre .....Dollars	22.88	15.20	16.62	14.15	18.66	23.44	39.27	14.58	13.20
6. Net receipts, per acre .....Dollars	14.52	1.88	-2.96	19.22	11.74	6.46	7.08	-5.32	-7.13
7. Land investment, per acre[1] .....Dollars	86.00	46.00	54.00	64.00	65.00	64.00	125.00	32.00	35.00
8. Total investment, per acre .....Dollars	117.00	74.00	85.00	86.00	95.00	99.00	164.00	63.00	61.00
CROPS									
9. Corn (Wheat, 1929) .....Acres	7.1	34.0	22.0	19.2	33.0	18.0	--	42.0	38.0
10. " " " .....Bu.per Ac.	15.2	30.9	19.7	15.2	32.8	25.7	--	30.0	15.7
11. Barley .....Acres	19.6	25.0	24.0	26.0	16.0	20.0	17.2	34.0	25.0
12. " .....Bu.per Ac.	41.3	30.7	38.1	36.3	31.7	39.0	51.0	28.4	22.9
13. Alfalfa .....Acres	33.9	27.0	24.0	28.3	27.0	21.0	35.7	24.0	20.0
14. " .....Tons per Ac.	2.6	[1]	1.8	2.4	[1]	2.3	2.6	[1]	1.9
15. Sugar Beets .....Acres	28.3	22.0	18.0	22.7	33.0	29.0	29.7	10.0	10.0
16. " " .....Tons per Ac.	12.7	14.5	14.9	13.0	15.0	14.9	12.8	16.8	13.2
17. Potatoes .....Acres	10.2	--	11.0	16.2	--	2.0	7.2	--	20.0
18. " .....Bu.per Ac.	172.8	--	206.0	148.1	--	233.0	229.2	--	172.0
19. Returns, per $100 fed to productive livestock .....Dollars	117.00	102.00	69.00	155.00	137.00	112.00	82.00	72.00	57.00
Returns, per $100 invested in:									
20. All productive livestock .....Dollars	[2]	72.00	54.00	[2]	82.00	80.00	[2]	60.00	42.00
21. Cattle .....Dollars	[2]	39.00	21.00	[2]	56.00	51.00	[2]	21.00	10.00
22. Hogs .....Dollars	[2]	218.00	107.00	[2]	196.00	161.00	[2]	226.00	99.00
23. Poultry .....Dollars	[2]	128.00	125.00	[2]	222.00	129.00	[2]	72.00	136.00
24. Dairy sales, per cow .....Dollars	[2]	54.00	42.00	[2]	62.00	65.00	[2]	50.00	27.00
25. Receipts from productive livestock, per acre .....Dollars	10.80	5.07	3.74	8.71	6.03	5.38	13.26	5.64	2.62
26. Investment in productive livestock, per acre .....Dollars	10.86	7.03	6.96	8.50	7.35	6.71	13.29	9.36	6.28

APPENDIX G. - Contd. 2.

Factors Useful in Analyzing the Farm Business	Average, All Farms			Average, Most Profitable Farms			Average, Least Profitable Farms		
	1929 (27)	1930 (29)	1931 (20)	1929 (10)	1930 (10)	1931 (7)	1929 (10)	1930 (10)	1931 (7)
27. Man labor cost, per $100 gross income ..... Dollars	2/	46.00	58.00	2/	34.00	44.00	2/	75.00	96.00
28. Man labor, power, and machinery cost, per $100 gross income ..... Dollars	2/	67.00	92.00	2/	47.00	61.00	2/	118.00	164.00
29. Man labor cost, per acre ..... Dollars	13.38	7.91	7.97	9.59	10.19	13.07	19.42	6.93	5.84
30. Total feed cost for horses ..... Dollars	--	244.00	191.00	--	230.00	200.00	--	285.00	202.00
31. Power and machinery cost, per acre in crops ..... Dollars	8.70	6.28	6.92	7.05	5.72	5.92	11.56	7.81	8.11
32. Expense, per $100 gross income .... Dollars	61.00	89.00	122.00	42.00	61.00	78.00	85.00	157.00	217.00
33. Farms with tractors ..... Number	--	12	7	--	4	2	--	4	2
CAPITAL INVESTMENTS									
34. Total ..... Dollars	19924	19318	15036	19625	19654	11040	18918	17519	15119
35. Land ..... Dollars	14921	12096	9568	14537	13431	7217	14365	8855	8614
36. Farm improvements ..... Dollars		1813	1644		1576	1317		1959	1868
37. Livestock, total ..... Dollars	2377	2332	1595	2483	1864	1101	2015	3252	1950
38. Horses ..... Dollars	528	490	367	551	363	349	484	641	404
39. Cattle ..... Dollars	1216	1173	668	1304	1019	498	836	1466	800
40. Hogs ..... Dollars	398	318	279	476	200	162	329	464	402
41. Sheep ..... Dollars	116	225	174	--	124	14	307	528	238
42. Bees ("Others", 1929) ..... Dollars	25	31	28	66	71	9	--	19	56
43. Poultry ..... Dollars	94	95	79	86	87	69	59	134	50
44. Machinery and equipment ..... Dollars	1779	1815	1562	1616	1632	1072	1744	2128	1538
45. Feed, grain, and supplies ..... Dollars	847	1262	667	989	1151	333	794	1325	1149
RECEIPTS--NET INCREASES									
46. Total ..... Dollars	6365	4463	2410	7582	6295	3348	5340	2584	1495
47. Livestock, total ..... Dollars	1815	1331	730	1971	1274	657	1510	1590	721
48. Horses ..... Dollars	-23	--	--	-8	--	--	-17	3	--
49. Cattle ..... Dollars	306	153	--	459	158	--	179	32	--
50. Hogs ..... Dollars	736	738	297	814	479	259	767	1114	399
51. Sheep ..... Dollars	84	31	119	92	21	1	136	70	84
52. Bees ("Others", 1929) ..... Dollars	10	--	2	7	--	--	--	2	10
53. Poultry ..... Dollars	46	10	19	67	39	11	18	--	14
54. Egg sales ..... Dollars	125	103	80	144	173	78	58	94	55
55. Dairy sales ..... Dollars	531	296	213	396	404	308	369	275	159

APPENDIX G. - Contd. 3.

Factors Useful in Analyzing the Farm Business	Average, All Farms			Average, Most Profitable Farms			Average, Least Profitable Farms		
	1929 (27)	1930 (29)	1931 (20)	1929 (10)	1930 (10)	1931 (7)	1929 (10)	1930 (10)	1931 (7)
56. Feed, grain, and supplies[3/] .....Dollars	4449	3006	1614	5571	4868	2614	3779	862	715
57. Labor off the farm .....Dollars	--	80	52	--	96	76	--	59	49
58. Miscellaneous receipts .....Dollars	101	46	14	40	57	1	51	73	10
EXPENSES--NET DECREASES									
59. Total .....Dollars	3895	3043	2217	3215	2848	1971	4525	3329	2411
60. Farm improvements .....Dollars	94	171	132	120	105	101	70	224	128
61. Horses .....Dollars	--	33	78	--	35	13	--	--	152
62. Miscellaneous livestock decreases .....Dollars	--	7	71	--	24	55	--	13	77
63. Machinery and equipment .....Dollars	747	650	531	659	588	351	822	834	665
64. Feed, grain, and supplies .....Dollars	850	--	--	612	--	--	1219	--	--
65. Livestock expense .....Dollars	25	26	20	16	18	15	30	23	27
66. Crop expense .....Dollars	242	374	277	298	383	280	200	469	211
67. Hired labor .....Dollars	1380	1183	717	1203	1144	838	1473	1229	639
68. Taxes[3/] .....Dollars	242	531	362	298	533	302	200	426	493
69. Miscellaneous expenses .....Dollars	315	68	29	104	18	16	461	111	19
70. Receipts less expenses .....Dollars	2470	1420	193	4367	3447	1377	815	-745	-916
71. Total unpaid labor .....Dollars	129	930	715	195	1017	654	10	740	840
72. Net income from investment and management .....Dollars	2341	490	-522	4172	2430	723	805	1485	-1756
73. Rate earned on investment .....Per cent	[2/]	2.90	-3.20	[2/]	13.55	7.47	[2/]	-7.32	-13.84
74. Return to capital and operator's labor and management .....Dollars	[2/]	1186	78	[2/]	3150	1324	[2/]	-837	-1156
75. Five per cent interest on investment .....Dollars	[2/]	966	752	[2/]	983	552	[2/]	876	756
76. Labor and management wage .....Dollars	1727	220	-674	3418	2167	772	278	-1713	-1912

1/ Value of land and buildings, 1929.
2/ Not reported.
3/ It should be noted that the item of taxes in this statement represents a substantially lower amount per acre than that constituted by the state and county levies, plus District assessments, placed against most of the lands in Farmers' Irrigation District.

Definitions and Explanation of Terms for Appendix G.

The figures used in this study were taken for the entire farm without regard to ownership.

Receipts. - These items represent net increases, taking into account inventory changes, cash receipts, and cash expenditures. This applies to all items of income except egg sales, dairy sales, income from labor off the farm, and miscellaneous receipts, which are added to the net increases.

Expenses. - These items represent cash expenditures, net decreases for farm improvements and machinery and net decreases, if any, for the different classes of livestock and for feed, grain, and supplies.

Returns from Feed Fed to Productive Livestock. - Productive livestock is all livestock except horses and mules. Purchased feed was charged at the prices paid for it. Pasture was charged at rates given by individual farmers. In cases where this rate was omitted, conservative estimates have been made. All other feed was charged at weighted average prices based on prices given in the two inventories. This was obtained for each item of feed by dividing the sum of the total values in both inventories by the sum of the total amounts of both inventories for each kind of feed. Each cooperator estimated the amounts of different feeds fed to horses and mules or if this was omitted, a conservative estimate was made when the data were compiled. The value of horse and mule feed was deducted from the total charged for all feed fed. This gave the feed charge for productive livestock.

Investment. - All figures on investment for different items are the values shown in the opening inventory except that adjustments were made where these values manifestly did not show a representative investment throughout the year.

Receipts from Productive Livestock per acre. - This item was obtained by dividing the net increases from productive livestock by the total acres in the farm.

Man Labor Cost. - The labor of the operator and any unpaid family labor was charged at $50 per month to cover wages, board, room, and laundry. Hired labor was charged at the wages paid plus $10 per month to cover board, room, and laundry.

Man Labor, Power, and Machinery Cost. - This item was obtained in the same manner as the item above except that to the man labor charge was added all items of power and machinery cost. Power cost includes the charge for horse feed and the net decrease on horses and mules as well as all costs of tractor operation. Machinery cost includes the net decrease on all machinery and equipment.

Total Unpaid Labor. - This item includes the charge for the operator's labor and for members of his family as noted above and also the charge for board, room, and laundry for hired labor.

Net Income from Investment and Management. - This item was obtained by deducting the value of all unpaid labor from the net farm income which appears under the heading, "Receipts less expenses."

Rate Earned on Investment. - This item shows what per cent the figure appearing as "Net income from investment and management," is of the figure representing "Capital Investments--total."

Definitions and Explanation of Terms for Appendix G. - Contd.

Return to Capital and Operator's Labor and Management. - This item is what remains of the "Receipts less expenses" after deducting the value of the unpaid family labor. This item of deduction does not include the value of the operator's labor.

Interest on Investment at 5 Per cent. - This item shows what the capital invested in the farm business would return if it earned 5 per cent interest.

Labor and Management Wage. - This item shows what the operator made for his labor and management if we assume his capital earned 5 per cent interest. The figure is obtained by deducting "Interest on investment at 5 per cent" from "Return to capital and operator's labor and management."

Estimates. - Some of the records when submitted to the agricultural college were incomplete in some details. In most instances letters were written to the cooperators in an effort to get complete and correct data on these items. In some cases these incomplete items were estimated and entered when the books were summarized. Such estimates were made on the basis of 1930 records where such were available. In other instances estimates were made on the basis of what seemed reasonable which may be in error, but it was believed that an estimated entry would be more nearly correct than no entry at all. We did not write for these because of the difficulty of making plain through correspondence just what was wanted.

Capital Investment and Receipts - Totals. - It will be noted in Appendix G that the sections showing "Investments" and "Receipts" include totals for the livestock items. The final totals for these two sections do not include again the separate items for the different classes of livestock.

APPENDIX H. - Average local farm prices, 1923-1932:- Sugar beets from Great Western Sugar Company; other crops from reports of Pathfinder Irrigation District.

Year	Sugar beets	Alfalfa	Barley	Corn	Potatoes	Oats	Miscellaneous
	Per ton	Per ton	Per bushel	Per bushel	Per bushel	Per bushel	Per acre
1923	$8.18	$7.00	$0.48	$0.50	$0.45	$0.40	$21.21
1924	7.50	8.00	.60	.75	.40	.48	12.44
1925	6.00	8.50	.55	.60	1.05	.40	16.15
1926	8.00	6.00	.48	.50	.85	.40	16.04
1927	8.00	5.00	.53	.20	.40	.40	21.42
1928	7.00	8.00	.45	.65	.13	.35	18.77
1929	7.00	8.50	.50	.70	.87	.32	16.76
1930	7.00	6.50	.35	.50	.47	.25	18.73
1931	5.50	5.50	.26	.41	.17	.25	11.08
1932	4.00	5.00	.12	.19	.15	.13	8.40

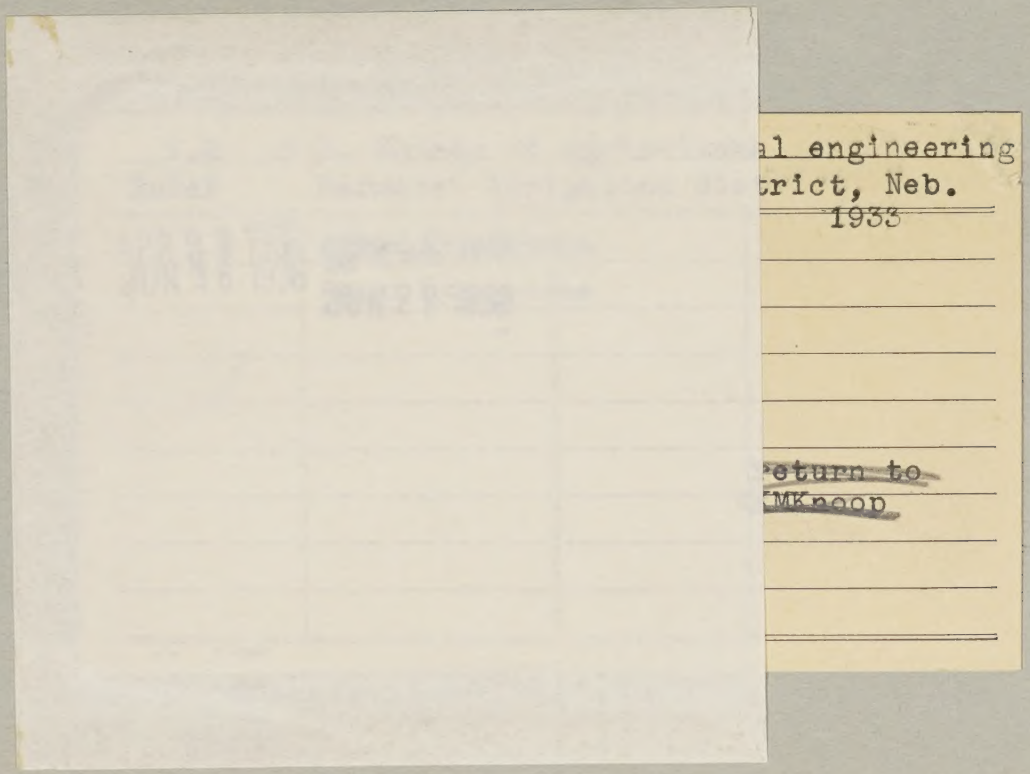
APPENDIX I. - Crop yields and gross income from cropped area of 50,000 acres; yields based upon 5-year average (1928-1932) of sugar beet yields in Farmers' Irrigation District and other crop yields in Pathfinder Irrigation District.

Crop	Area		Annual crop yields			Annual gross income, based upon different price levels			
	Per cent of total cropped area	Acres	Unit	Average 1928-1932		Average 1923-1929	1930	1931	1932
				Per acre	Total				
Beets: Group 1	5.61	2,805	Ton	9.1983	25,801.23	$ 190,487	$ 180,609	$ 141,907	$ 103,205
" 2	9.90	4,950	"	11.3593	56,228.54	415,127	393,600	309,257	224,914
" 3	11.22	5,610	"	13.5478	76,003.16	561,120	532,022	418,017	304,013
" 4	6.27	3,135	"	15.7741	49,451.80	365,096	346,163	271,985	197,807
Total	33	16,500	"	12.57	207,484.73	$1,531,830	$1,452,394	$1,141,166	$ 829,939
Alfalfa	18	9,000	"	1.79	16,110	117,373	104,715	88,605	80,550
Barley	18	9,000	Bu.	35	315,000	161,550	110,250	81,900	37,800
Corn	16	8,000	"	20	160,000	89,143	80,000	65,600	30,400
Potatoes	6	3,000	"	146	438,000	259,671	205,860	74,460	65,700
Oats	5	2,500	"	33	82,500	32,411	20,625	20,625	10,725
Miscellaneous	4	2,000	-	-	-	35,083	37,460	22,160	16,800
Total	100	50,000	-	-	-	$2,227,061	$2,011,304	$1,494,516	$1,071,914

APPENDIX J. - Annual Levies Necessary to Amortize District Bond and United States Contract Obligations.[1/]

	Approximate amount to be raised	Average levy per acre	Levies upon lands of different valuations, per acre									
			$50	$45	$40	$35	$30	$25	$20	$10	$1	Lots
Year 1933 (lowest levy except in 1971)	$ 125,000	$2.00	$2.60	$2.34	$2.08	$1.82	$1.56	$1.30	$1.04	$0.52	$0.05	$1.86
Majority of years	150,000	2.40	3.12	2.81	2.50	2.18	1.87	1.56	1.25	.62	.06	2.23
Years 1943 to 1945 (highest levies)	175,000	2.80	3.64	3.28	2.92	2.54	2.18	1.82	1.46	.72	.07	2.60

[1/] Based on assessed area of 62,500 acres.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